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AN AMERICAN WAR COLLEGE.

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IN no profession, trade or calling have the discoveries and inventions of modern science received a more extended application than in the Art of War. Steam, electricity, chemical knowledge and engineering skill are all enlisted in the science of warfare, giving to armies greater mobility, power of concentration, and facility of supply than ever before known; enabling generals to handle larger forces, and control greater combinations, on more extended theatres of war than was possible at earlier dates; enabling military engineers to construct fortifications of such strength as to dwarf the forts of the last generation into utter insignificance; and giving to modern weapons a degree of destructiveness exceeding anything dreamed of a quarter of a century ago.

As a result of this great advance in military science, the officers of the present day require a greater degree of professional and scientific preparation than ever before known in the history of war. The high (and ever-essential) attributes of physical and moral courage, coolness, power of quick and correct thought and

action, patriotism and zeal, no longer suffice to make the perfect military leader, but must be supplemented by careful training in the many branches of human knowledge which are now used in every feature of the profession of arms. The army officer of the present day should differ as much from his predecessor of fifty years ago as a locomotive differs from a stage-coach, or a magazine rifle from a flint-lock musket.

A corresponding difference in training has become necessary for the young men whom the Government educates for its military service, and upon whose knowledge or deficiencies may depend the future weal or woe of the Nation. A cadet school (though of more value than ever before) is no longer sufficient for the education of an officer. The excellent curriculum of West Point, though crowded to the utmost, can no longer give, in the course of four years, all the training necessary for the advanced soldier of the present day. This fact is recognized in the establishment of the School of Engineers at Willet's Point, in the founding of the Artillery School at Fort Monroe, and, still more recently, in the creation of the Infantry and Cavalry School at Fort Leavenworth.

Though the establishment of the Infantry and Cavalry School was felt to be a necessity, the order which first called it into being shows a strangely modest idea of the results which it could accomplish, and does not indicate an appreciation of the importance which the school is undoubtedly destined to attain. At first, the main object of the institution appears to have been to remedy the educational defects of certain officers who had never enjoyed the benefits of instruction at any seminary of learning above the grade of a primary school; and the order referred to set forth the desirability of teaching the students "legible handwriting and correct reading aloud." To be sure, there was a course of military study prescribed, which would be of value even to officers possessing a graduating diploma from West Point; but the fact that the curriculum embraced arithmetic, geography, grammar and similar studies with which every schoolboy should be familiar, caused the new institution to be spoken of contemptuously as a "kindergarten," and handicapped it with a weight of disrepute which it has taken some years to throw off. The school has, however, now passed far beyond its humble beginning. It has steadily improved in the extent of its curriculum, and in its methods of instruction. Its common-school features

have been entirely eliminated; and it will soon be able safely to assert the proud claim of being a war college in every sense of the term.

The following is a comparison of the curriculum of the Fort Leavenworth School with the courses of study at the German War Schools and the celebrated War Academy at Berlin:

GERMAN WAR SCHOOLS. (Course, one year.)	U. S. INF. AND CAV. SCHOOLS. (Course, two years.)	WAR ACADEMY AT BERLIN. (Course, three years.)
Tactics.	Strategy and Grand Tactics.	History of Wars.
Science of Arms.	Tactics.	Tactics.
Munitions of War.	Applied Tactics.	Applied Tactics.
Fortification.	Artillery.	Artillery.
Topography.	Field Fortification.	Field Fortification.
Surveying.	Field Engineering.	Permanent Fortification.
Military Regulations.	Surveying.	Attack and Defence of Fortresses.
Military Correspondence.	Topography.	Topography.
	Hippology.	Duties of the General Staff.
	Military Administration.	Military Administration.
	Military Hygiene.	Military Hygiene.
	Signalling.	Military Geography.
	Telegraphy.	Mathematics.
	Photography.	* Higher Mathematics.
	Military Law.	* Geodesy.
	Constitutional Law.	* Ancient History and History of the Middle Ages.
	International Law.	* History of Literature.
	Ordnance and Gunnery (Limited Course.)	* Modern History.
	Infantry Drill Book.	* Geography.
	Cavalry Drill Book.	* Physical Geography.
	Artillery Drill Book.	* Chemistry.
		* Experimental Philosophy.
		* French.
		* Russian.

The text-books used at the Infantry and Cavalry School, covering the above-mentioned subjects, are as follows:

Hamley's Operations of War.	Clark's Building Superintendence.
Shaw's Elementary Tactics.	Fitzwygram's Horses and Stables.
Home's Précis of Modern Tactics.	Dwyer's Bits and Bitting.
Mayne's Infantry Fire Tactics.	Myer's Manual of Signalling.
Tidball's Manual of Artillery.	Winthrop's Military Law and Courts-Martial.
Calef's Machine Guns.	Cooley's Constitutional Law.
Pratt's Field Artillery.	Davis' International Law.
Manual of Field Engineering.	U. S. Infantry Tactics.
Johnson's Surveying.	U. S. Cavalry Tactics.
Richards' Military Topography.	U. S. Artillery Tactics.

* Optional. Each student is, however, required to select one or more of the optional studies which then become obligatory.

Military administration, and military hygiene, are taught by lecture. Telegraphy and photography are taught practically.

A change in the present curriculum is contemplated, to the extent of dropping constitutional law and international law, and taking in their stead the subject of military geography, and a more extended course in military administration.

Each member of the class is required to submit a graduating thesis, in the form of an essay on some military subject. Each student is allowed to select his own theme, subject to the approval of the commanding officer of the school. Though generally limited to the subjects of strategy and tactics, the topics embrace also military administration and matters pertinent to our national military policy.

Bearing in mind that the course at the German War Schools is deemed sufficient to fit an ensign for his duties as an officer of the line, and that it follows as a supplement to the course of instruction given at the Central Cadet School, and noting that the War Academy in Berlin is a school for the education of officers selected from the line for positions in the celebrated German General Staff, a consideration of the foregoing comparison of the curricula of those institutions with the course of study pursued at Fort Leavenworth, will show that the military qualifications of an *alumnus* of the Infantry and Cavalry School, as it now stands, are of a high order. Nor is the curriculum of the School, as given above, a mere list of subjects receiving superficial study. The course is thorough and practical. Every officer who graduates at Fort Leavenworth is qualified to survey and map any region; to make a reconnaisance, either mounted or on foot, and render a good field map and report of the result; to construct field fortifications and military bridges; to drill a company, troop or battalion; to command an outpost, an advanced guard, or a rear guard; to adapt the tactics of his own arm to the *terrain* on which he may be using it; and much else that may be of inestimable value to him in the practical duties of war. Nothing is limited to mere theory. The course in the Art of War (probably the most extended one taught in America) is not limited to military history and a theoretical study of campaigns; but, in its branch of minor tactics, embraces the solution of military problems in the field. The month of October each year is devoted to this practical work, for which the large military reservation of Fort Leavenworth affords

peculiar advantages. Three of the field problems of last October are here given, and though (being unaccompanied by maps) they may not, perhaps, be clearly understood by those who are unacquainted with the geography and topography of the immediate vicinity of Fort Leavenworth, they will, at least, furnish an idea of the kind of work that is done. It should be remarked that the student officers have no information of the nature of the problem until they are given command of the troops on the field. They are then provided with maps, and with such information as to the opposing force as could reasonably be expected to have been obtained by reconnaisance. The opposing forces are designated as "Blue" and "Brown," the former being clothed in the regulation uniform, the latter in brown canvas suits and campaign hats.

PROBLEM NO. 1.

Detachments to march from different stations, and concentrate at a fixed point at a given time.

A troop of cavalry is divided into four detachments, each representing two troops, and stationed as follows:

One detachment at Weston.

One detachment at Beverly.

One detachment at Tracy.

One detachment at first junction of roads west of Bee Creek, on Weston-Platte City road.

Each officer in command of a detachment is ordered to report at Farley with his command at 3.30 P. M. Each command must march in the manner prescribed in the U. S. Cavalry Tactics.

Each commander knows the starting points of all the detachments. Care must be taken by each commander to avoid the interruption of the march of another command by crossing its immediate front. No halts other than those prescribed in the cavalry drill-book must be made, and no command shall move faster than a walk.

The problem to be solved by each detachment commander is, then:

1. "What is the distance from this point to Farley?

2. "At what rate can my command march?

3. "At what time, consequently, must I start?

4. "What preparation must I make before starting, namely, When must the cooks be awakened? When must reveille be sounded?—stables—breakfast call—the general—boots and saddles—the assembly?

"How can I best avoid a crossing of the lines of march of my own and the other columns?"

Each commander will report to the instructor, at Farley, the manner in which he has answered (practically) the above questions. Each commander, in solving this problem, should continually bear in mind the *supposed* size of his command.

After a halt and a rest of two hours at Farley, the command will return to the post.

In solving this problem, as the commands started in the afternoon, the morning preliminaries to the march were merely supposed; but each detachment commander stated exactly the intervals of time that would be required for them in actual practice. The commands concentrated promptly at Farley, the greatest variance from the designated time being six minutes. The average march was about seven miles.

PROBLEM NO. 2.

Advance of a Column and Attack on a Village.

An imaginary Blue force is advancing on Kickapoo from Fort Leavenworth. The commander of the advanced guard (real), consisting of the three companies of infantry and one troop of cavalry, receives information that Brown cavalry has been seen in the vicinity of Kickapoo. He is ordered to reconnoitre the village, and, if it be found not too strongly held, to assault and occupy it. He receives the following order:

"Imaginary column and its advanced guard will march by the Sheridan Road, and a flanking party (cavalry) will be sent by the road which passes the railroad cut and leads north from 'The Frenchman's.' The advanced guard will be halted at the junction of this road with the Millwood Road until joined by the flanking party. A reconnaissance of Kickapoo will then be made, and the village will be attacked if not too strongly held."

The commander of the Blue advanced guard has, then, to solve the following problem:

1. The disposition and march of the advanced guard.
2. The conduct of the flanking party.
3. The reconnaissance of the village of Kickapoo.
4. The attack on Kickapoo.

The commander of the Brown advanced guard receives the following order:

"You will establish an outpost in Kickapoo (two troops of cavalry), posting vedettes to watch all the avenues of approach, west, southwest and south, and constantly patrolling to obtain information of the enemy reported advancing from the south. If possible, you will hold the village and destroy the railroad in its vicinity. Reports should be sent in frequently."

The problem for the Brown commander, then, embraces the occupation and defence of a village.

In this problem the Brown commander displayed great skill and good judgment, and the victory was awarded to him.

PROBLEM NO. 3.

Brown: Screening and Reconnoitering Duties of Cavalry.

An imaginary force of Brown cavalry has crossed the Missouri River on the bridge at Atchison, with the intention of striking the Kansas Pacific R. R. in the vicinity of Topeka.

One troop (real) has been detached and sent to Salt Creek Valley and vicinity, to

ascertain the strength and intention of any force of the enemy in the neighborhood of Leavenworth.

The troop commander has been informed that it is the intention of the Brown force to return and re-cross at Atchison the same night after striking the railroad. He also receives the following instructions:

"You will ascertain at once, and report promptly, whether the enemy has any force of infantry at or near Fort Leavenworth: whether he is yet aware of our crossing, and is making any dispositions in force. You will probably find small forces of the enemy's cavalry in the vicinity of Salt Creek Valley, from whom no danger to the bridge is to be apprehended, as the guard left there will be able to protect it from a troop or two of cavalry. Your first and important object is to report to me the strength and movements of any infantry force of the enemy. If found, whether they move at all, or move to interpose between us and the railroad, or seek to cut us off from the bridge.

"Cover all the roads leading west, up the river, as far south as the road which, passing south of the hills, crosses the 'Narrow Gauge Siding,' and to the north as far as the river. Send dispatches up the Atchison pike ('Telegraph road') to meet courier sent out from the main column.

"Send positive and definite information. My movements depend upon your reports."

Blue: Movements of a Squadron Screening and Reconnoitering in Advance of an Infantry Column.

In addition to the reconnoitering cavalry, the Blue force consists of an infantry column (five companies), with wagons to represent artillery, which column will march, in accordance with instructions given later, to a point overlooking Salt Creek Valley.

The commanding officer of the Blue forces receives information that a force of Brown cavalry crossed Atchison bridge at daylight, and that they have left a guard at the bridge, indicating an intention to return soon.

The commanding officer of the Blue orders forward his cavalry (two troops disposed in reconnaissance formation) to cover all roads leading in the direction of Atchison, from the river to the road passing south of the hills and crossing the Narrow Guage R. R. at the "Siding."

The station of the Blue commander will be on the Millwood road.

The commanding officer of the Blue cavalry receives the following instructions from the Blue commander:

"It is my intention to move in force with infantry and artillery to seize the Atchison bridge. You will push back rapidly all patrols of the enemy, and prevent them from gaining information of our intention. Try to drive them away from the river, and produce the impression that your object is to hang on the rear of the raiding force.

"The movement of the infantry will be *via* Kickapoo and up the river behind the heavy timber. *Clear the hills in our immediate front, as you move out.*"

This problem afforded exercise to the student-officers in commanding small cavalry patrols, and writing field dispatches. To the commanders of the cavalry forces it afforded exercise in the disposition and management of a long front of patrols, working for the attainment of a definite object. Every patrol of three or more men was under the command of a lieutenant.

Two hours after the Brown cavalry left the post, the Blue cavalry started out, followed an hour later, by the infantry and

wagons. The infantry marched around the north end of the hills west of the post, to a point overlooking the bridge on the Millwood Road, where it could be plainly seen by any Brown patrol, *provided that such patrol should succeed in penetrating the screen of the Blue cavalry, and not coming under the fire of the Blue infantry.*

The object of the Brown was, then, to penetrate the screen, observe the troops constituting the main body, and get back, with a report of the strength of the same, to their commander. The object of the Blue cavalry was to screen the main body, and, at the same time, push back the opposing force from the river. All the Brown patrols, except one, were pushed back by the Blue. One patrol, however, consisting of a lieutenant and two men, succeeded in penetrating the screen, and observing the strength and disposition of the main body of the Blue. In attempting to return, the lieutenant and one of his men were captured; but the other man succeeded in getting through to the Brown commander with a dispatch containing the desired information, and the exercise was, consequently, decided in favor of the Brown force.

These problems are merely specimens of the many practical exercises in minor tactics carried out at Fort Leavenworth. These exercises cover the duties of out-posts, advanced-guards, rear-guards, patrols, screening and reconnoitering parties, etc. The rules governing the field exercises are as follows:

1. The authority of the instructors in the Art of War will be recognized in field exercises the same as in the section-room.

2. A map of the field of operations will be furnished the commanding officer of each of the opposing forces.

3. Special instructions will be given each commander.

4. Neither of the opposing commanders will be given any intimation as to the instructions given to his opponent. Each commander will have only such information in regard to his opponent's position and movements as may be reasonably supposed to have been ascertained by reconnaissance.

5. The special instructions given to each commander will be clear and concise. The commander may question the instructor in regard to such points as may seem necessary for the elucidation of the part to be performed by the former; but all questions in regard to the position and operations of the opposing commander are positively prohibited.

6. Blank cartridges must not be fired at a less distance than 60 paces. Should the opposing forces happen to approach nearer to each other, the officers at once give orders to halt and order arms. The umpires then decide what is to be done.

7. Cavalry charges must stop at 100 paces from the enemy. The charges will be made at a trot.

8. If a cavalry commander using fire action allows a cavalry opponent to approach in line mounted within 200 yards of his position before his own troops are deployed and

begin firing, the victory will be awarded to the mounted party. If a heavy dismounted fire is opened upon the mounted party at a greater distance than 200 yards, the victory will be awarded to the dismounted party.

9. When a flank is turned, unless a change of front is promptly executed to meet it, the defenders must fall back to a new position. This rule applies equally to cavalry and infantry.

10. Firing in the vicinity of houses and haystacks is forbidden.

11. Except on the Reservation, movements will be confined to the roads. No trespassing on private grounds will be permitted.

12. Free passage of roads by vehicles and pedestrians must not be interfered with. Each force will be provided with a signal flag, and when a cessation of fire becomes necessary on account of the passage of civilians over the road, the signal "Attention" will be given with the flag, followed by the trumpet signal "cease firing." This signal will be answered by the opposing force with the same flag signal followed by three trumpet signals of "Halt." After the signals prescribed are given and answered, all firing must cease and no alterations in the positions of the forces will be made until the signal is given (by the party which first signaled), by waving the flag three times to the right, and sounding on the trumpet the first five notes of Reveille, and an answer is returned by the same flag signal followed by the first six notes of Tattoo.

13. Each commander must submit a report of operations, accompanied by a map made by the topographical officer within twenty-four hours after the close of the exercise. The reports by commanders of advanced-guards, outposts, etc., will be made to the commanders of the imaginary armies, and transmitted by the latter to the instructor in the Art of War. The reports will be addressed to "The Commander of the Blue (or Brown) Forces, Fort Leavenworth, Kansas." Such commanders in forwarding the reports will sign their proper rank, followed by the words, "Commanding Blue (or Brown) Forces."

14. The instructors in the Art of War will act as umpires, and their decisions must be unhesitatingly observed. Each umpire will wear a broad white band on his hat.

In addition to these regulations, there are special rules for patrols, etc., which it would require too much space to give in full.

The Infantry and Cavalry School was the first military institution in the United States to introduce and systematize practical instruction in minor tactics. This instruction was begun in 1887; but it has since been greatly extended and improved.

Instruction in problems embracing the handling of large bodies of troops cannot, of course, be given in the field; but these problems are made as practical as possible in the section-room. A large map showing the topographical features of a given region is used for this purpose. The position of an army corps is given in general terms. The officer designated as the commander of the corps posts his divisions; the commanders of the latter post their brigades; and the positions of the outposts are clearly defined. An opposing force is similarly placed. Certain information is supposed to have been gained by the commander of each army, and then follow the orders, regularly written out, by the different

commanders. These orders are formulated as they would be in an actual campaign, and embrace everything from the general movement down to the instructions for the advanced guards—each subdivision of the Army having its designated commander. This instruction (which in its main features savors much of *kriegsspiel*) is continued only so long as the similitude of War could reasonably be expected to exist, and does not include a game of battle, in which no war game can adequately provide for the many elements of chance, the difference in the fighting qualities of troops, etc., which influence actual combat. This interesting and promising method of instruction is still in its incipiency at Fort Leavenworth; only one problem of this kind having been given to the present class. An extended course of this nature is contemplated for the next term.

The above description of the course and methods of instruction will give an idea of the present condition of the Infantry and Cavalry School. In one respect it is like the world; for it has been created out of nothing, and the result is good. Too much credit cannot be given to the able officers who have been in command of the School; for it is not too much to say that the work accomplished in developing the institution has not been because of encouragement and assistance, so much as in spite of many obstacles and much discouragement. The School seems to have been grudgingly supported, often misunderstood, and rarely recognized at anything approaching its true worth. For the first time since its beginning, it has this year received an appropriation for its support; $1,500 being allowed this year for the purchase of books, engineering instruments, etc.

While everything that *could* be done *has* been done by the present commanding officer of the School to increase its efficiency, and to raise it from a "kindergarten" to a veritable war college, higher authority must step in solve some of the embarrassing problems with which the institution must deal before its efficiency can reach the desired point, and its sphere of usefulness be developed to the full extent. It has been truly remarked that probably no other educational institution worthy of the name has to encounter the inconvenience of accepting students of widely various degrees of preparation, with the object of putting them all through the same course of study. The problem in regard to some of the young officers promoted from the ranks, or appointed from civil life, whose educational attainments are exceedingly limited, is

the first that calls for solution. One of two things must be done in their case; either they must take a course which has no higher object than remedying their deficiencies in common-school branches, or else they must be dragged through a curriculum which is really beyond their power, or in which they are, at least, seriously handicapped in the competition with their more fortunate comrades. In either case the higher objects of the School are embarrassed, and in the former case, a war college is degraded to the level of a common-school. It is not to be understood that these remarks apply to *all* the officers from the ranks or civil life. Some of these officers have made distinguished records at the School; but every class, thus far, has contained *some* officers whose educational deficiencies were deplorable. An attempt to relieve the embarrassment coming from this source has been made by requiring regimental commanders to make the details of student-officers one year in advance of the time for reporting at the School, thus giving the detailed officer time to prepare for the course; but this requirement has, it seems, been ignored quite as often as it has been complied with. Moreover, it cannot completely remedy the evil. It seems, however, quite possible to solve the problem completely, with the aid of a little legislation. It is probable that, for some years to come, the number of appointments from civil life will be so limited that this class of officers may be left out of the question. It only remains to consider the case of officers promoted from the ranks. The present system of promotion should be changed. The candidates for promotion should be required first to pass an examination identical with that required for admission to West Point, They should then be sent to some school (which could, perhaps, be most conveniently located at Fort Leavenworth), where they should be given a course of one year in algebra, geometry, trigonometry, surveying and drawing. While taking this course, they should hold the honorable status of "candidates for promotion," should not be quartered with the other enlisted men, and should receive a sufficient increase of pay to enable them to live in a manner befitting their new position. At the end of the year they should be required to undergo a rigid examination in the studies mentioned, and those who pass should be commissioned, while those who fail should be offered the choice of an honorable discharge or a return to their non-commissioned grade. Any man with brains enough to deserve a commission could certainly master the

course prescribed; and he would then be in a condition to begin the curriculum of the Infantry and Cavalry School with a proper foundation on which to build the superstructure of a military education. Moreover, the candidate would thus be, for one year, under the daily observation of his instructors, who could form a more correct estimate of his merits and demerits than can possibly be obtained under the present system.

Another question which urgently demands an answer is: What shall be done with the officers who are found deficient in their studies at the School? Every class, thus far, has contained a few officers who neglect their studies, and who console themselves, when "found," with the knowledge that their prospects for promotion have not been impaired in the least. In several cases, by unfortunate coincidence, promotion has almost immediately followed the declaration of an officer's deficiency, and has seemed, consequently, like a positive reward of *demerit*. Should a law be passed requiring examination for promotion, and making a graduating diploma from the Infantry and Cavalry School a sufficient proof of the mental fitness of its possessor for a captaincy; or should the view of the commanding general, that the officers found deficient at the school have forfeited their right to promotion, be sustained, this evil would at once disappear.

The name of each graduate of the School should be marked in the Army Register with a star, or with some other indication of his graduation. This seems particularly desirable in the case of officers promoted from the ranks or appointed from civil life. The letters "M. A." after the name of each graduate in the Army Register give some indication of his qualifications; but there is nothing to show whether an officer who enters the Army through other gates than those of West Point is a man of the highest scholarly and military attainments, or a man who merely knew enough to squeeze through the limited examination required for his appointment. Every officer who graduates at the Infantry and Cavalry School has a good military education; and it is nothing more than justice to him that the fact be known to all who see his name on the official list.

A change in the manner of providing instructors is a matter of vital importance to the School. The selection of instructors is now limited almost entirely to officers on duty with their commands at the post of Fort Leavenworth;* and the results ob-

* Captain J. G. D. Knight, C. E., and his assistant, Lieut. James A. Irons, 20th Inf., are the

tained by this system of selection are not always entirely satisfactory. Instructors should be selected from the entire Army, and detailed on "detached service" at the school by War Department order. Except in the Department of Engineering and Military Hygiene, they should preferably be taken from the infantry and cavalry. Each instructor should be detailed for a period not less than four years, and should be given the same pay and allowances as an assistant professor or "tactical officer" at West Point. Under the proposed system of appointment, the student officers would recognize in their instructors men selected from the entire Army because of special fitness, instead of regarding them as officers who happen to be available solely because of being on duty at the single post of Fort Leavenworth. On the other hand, capable and zealous instructors would receive more encourgement in the performance of a duty which requires diligent study and the exertion of their best efforts, and for which they now have no further reward than the approval of their immediate commander, and the consciousness of duty faithfully performed.

The infantry battalion at Fort Leavenworth should be increased by one company, thus giving it a strength of six companies. The tactical reasons for this change are too obvious to need comment. Moreover, this battalion should be constantly kept up to a full "war strength." This matter cannot possibly be better presented than in the words of Col. R. P. Hughes, Inspector General, U. S. A., in his report of Oct. 10, 1888:

"The Battalion of Engineers is the only one that is kept up to a fair numerical strength. The battalions at the other schools are by no means a fair representation of what a battalion would be on a war-footing, and the question naturally arises whether we are not inculcating wrong notions in the minds of these young officers in having them working with commands where a corporal's guard figures as a company, and a battalion does not have the numerical strength of a good sized company. Be that as it may, it is, certainly, very desirable that all young officers should be given some opportunity to learn what a battalion upon a war-footing really is, and some experience in the manipulation of it. In other armies, officers are given

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only instructors assigned to the School by War Department order. The excellent condition of the Department of Engineering furnishes a practical argument in favor of providing instructors for the other departments in the same manner.

an opportunity to gain their experience in the autunmal maneuvres, when the men on leave are called up. No such opportunity presents itself to our officers, and as there seems to be little prospect that the strength of our organizations will all be increased to such an extent as to enable our officers to get the instruction mentioned in serving with their own commands, the best means of supplying their want, and correcting the evil, would probably be found in increasing the national forces sufficiently to raise the strength of the battalions at our schools of application to such a strength as battalions may be reasonably expected to have in case of war?" It only remains to add that in the field exercises, last October, companies of infantry were known to appear with only twelve men in ranks, the other men being on duty that required their presence elsewhere—this, too, at a post where fatigue duty has been reduced to such a minimum as scarcely to exist at all!

The number of student officers detailed from each regiment should be increased from one to two. Assuming it to be desirable that every lieutenant of infantry and cavalry should have the benefit of instruction at the School, it is plain that the present system of making the details should be changed. By way of example, take the case of the Sixth Infantry. With the graduation of the present class, that regiment will have four *alumni* of the School; leaving among the lieutenants eighteen non-graduates. If these lieutenants were detailed in order of rank, it would take thirty-six years under the present system to graduate them all. It is evident that (even with the present slow promotion) some would, necessarily, be deprived of all opportunity of taking the course, by advancement to captaincies, before it would be possible to send then to the School. The question, then, becomes, what officers shall be excused from attending the School? If the ablest officers be omitted from the detail, the result will be that ambitious and studious officers will be deprived of desirable opportunities of studying their profession, and the institution will have the appearance of being a mere asylum for the mentally "lame, halt and blind." On the other hand, if only the most promising officers be detailed, the most deficient will be deprived of needed instruction. The problem can be solved only by increasing the number of officers detailed from each regiment.

Thus far we have considered only the present condition of the Infantry and Cavalry School, and the need of certain changes to

promote its efficiency. But, though the importance of the School is evident when we consider that it is for the military education of the officers of thirty-five out of the forty regiments in the service of the United States, its scope could be so developed as to make it of inestimable value as a factor in the general military policy of the Nation; for it could easily extend military instruction to the officers of the National Guard, and thus be the means of diffusing among the people a knowledge of the requirements of modern war.

It will be evident at once that the following plan would require legislation to put it in operation; but it is believed that such legislation would be cheerfully granted; for, in a nation whose policy is opposed to the maintenance of a large standing army, military strength must be sought in the wide dissemination of military knowledge among the people.

A number of officers of the National Guard might be instructed at Fort Leavenworth, the details being apportioned throughout the United States according to population; or better, perhaps, according to the strength of the organized militia of each State. The appointments of militia officers as student-officers at Fort Leavenworth should be made by the governors of States; the appointments to hold good for two years, and to be made through the Secretary of War, as the appointments of cadets are now made by members of Congress. The States should make provision for the payment to each of their student-officers, while at the School, a salary equal to that of a second-lieutenant in the regular Service. Each officer of the National Guard, while on duty at the School, should wear the same uniform as a second-lieutenant of the Army, receive the same allowance of quarters, be entitled to the same obedience and respect, and be subject to the regulations of the School and the rules and articles for the government of the armies of the United States. He should be unmarried, not less than twenty-one nor more than thirty years of age, and should be a graduate of some institution of learning of a grade not lower than a high school.

In return for the advantages thus conferred upon him, a State officer graduating at the Infantry and Cavalry School might be required to offer his services, as a commissioned officer of the National Guard, to the Governor of his State, for a period of five years; or in the event of his emigration to another State, to make a similar offer of his services to the Governor of his new

State, for the same period, less such period of service as he might have already rendered (subsequent to his graduation) in his old State. This, however, would be a matter to be determined by each State; which would, of course, have a right to impose upon its detailed officers such obligations and conditions as it might deem proper.

Each State student-officer should have the privilege of resigning his appointment, if he should find himself unable to master the course at the School, or if his private affairs should be in such a state as to render his remaining at the School a matter of injury to his prospects in civil life.

This plan seems perfectly practicable.* There is no compulsion in the matter; the General Government merely offers the advantages of the School to such States as may see fit to make use of them; and the best of opportunities for military training is presented to the officers of the National Guard at no other cost to the United States than that of providing them with quarters. If this plan were carried out, it is probable that the first few years would show only a limited number of State officers at the school; but it is believed that all the States would eventually avail themselves of the opportunity for the instruction of their militia officers, and that before the close of the present century every State would have its representatives at Fort Leavenworth. Though it is not, by any means, recommended that the United States assume the payment of the militia student-officers, it may be well to invite attention to the fact that if these officers were all mustered into the service of the United States for a period of two years (the period of instruction), and were commissioned during that period as additional second-lieutenants, and paid accordingly, the annual cost to the Nation for the instruction of forty officers of the National Guard would not exceed $56,000.

The benefits resulting from the systematic education of officers of the National Guard at the Infantry and Cavalry School would be beyond calculation. Military knowledge acquired at a school and post, which are regarded as models for the officers of the regular infantry and cavalry, would be disseminated among the

* This plan was originally suggested, in its essential features, in an essay by the writer on "The Military Necessities of the United States and the Best Provisions for Meeting Them," published in the JOURNAL OF THE MILITARY SERVICE INSTITUTION, in September, 1884. An experience of two years and a-half on duty at the Infantry and Cavalry School has convinced him of the practicability of the scheme proposed.

militia; uniformity would be promoted among the various State organizations; and a leaven would be infused in the National Guard, which would be worth vastly more than the temporary extraneous influence (valuable though it is) now exerted by officers of the Army detailed for duty at the State encampments. The War of Secession showed that our volunteers possessed all the native ability, energy, and courage that could be desired in soldiers; and many of them attained a proud eminence as commanders. But, throughout the entire contest, a lack of the knowledge of the details of the military profession, so indispensable, above all, to officers acting as adjutant-generals, inspectors, etc., was evident; and, as a result, our armies were too often in the condition of a strong, muscular man, whose nerves fail to respond quickly to the demands of the brain. The value, during that conflict, of a body of volunteer officers possessing such training as is now given at Fort Leavenworth would have been inestimable; and would probably have greatly lessened the duration of a costly and bloody war.

The foregoing sketch will give an idea of the present condition of the Infantry and Cavalry School, its needs, and its future possibilities. So much having already been done, notwithstanding the disadvantages under which the School has labored, it is reasonable to expect the greatest results if it be supported with the cordiality that its merits deserve. To deny the necessity of such schools as those at Willet's Point, Fort Monroe, and Fort Leavenworth, is to deny the plainest teachings of recent wars. To recognize the importance of these institutions, is to acknowledge at once that they should receive hearty support and be established on a basis worthy of the Army and the Nation. They should have the same recognition by Congress as the Military Academy at West Point; and should be regarded as indispensable elements of our military system. Yet the Infantry and Cavalry School rests only upon a War Department order; and, far from receiving the same recognition as West Point, it does not receive as much attention from those who shape our military policy as the Military Prison does. That institution is securely based on Congressional legislation, and a distinguished board, of which the Secretary of War is the head, watches over its welfare. No such importance has yet been attached to the promising school for the higher education of the officers of our cavalry and infantry. But it is not too much to hope that the preparation of officers for the duties

of War may yet be considered quite as important to the Nation as the punishment of enlisted men for the misdemeanors of Peace; and it is not, perhaps, extravagant to believe that the time will come when the seed planted at Fort Leavenworth will have grown into a great tree, and the honor of having established the Infantry and Cavalry School will be regarded as an additional leaf in the chaplet of the great man whose deeds include the March to the Sea and the masterly campaign in the mountains of Georgia.

MOBILIZATION.

IT is within comparatively recent times that the word which is taken for the title of this paper, has come to have a technical military meaning, and even now its exact signification is but little known and appreciated in this country. So true is this that our leading dictionaries, Webster and Worcester, give very brief and misleading definitions of it. About the best definition that can be found for it, is that given in Chambers' Encyclopedia, which is as follows, viz.:

MOBILIZE:—An adjective and verb, used respectively in regard to Continental armies, to designate a state of readiness for taking the field, and the act of making ready for such an operation, The process consists in augmenting a regiment from its peace to its war complement, in calling in men on furlough, in organizing the staff of divisions and brigades, constituting the commissariat, medical, artillery, and transport services, and in accumulating provisions and munitions. As the work of mobilizing an army causes great and inevitable expense, it is only resorted to when hostilities commence.

A little study of this definition will show that it were easier to write a book upon the subject, than a brief essay, but the recent concentration of the troops of the National Guard in New York, has brought the matter so forcibly to our attention, that it seems opportune to touch upon it at present.

Mobilization is essentially foreign, both in its conception and inception, and resulted primarily from the necessity of being ever ready to act, either on the offensive, or defensive, when considered in connection with the immense cost of modern armies, and it resulted, necessarily, from the relative geographical position of the great continental military powers, and the improvement and increase of railroads.

When War, that "malady of princes," as Erasmus calls it, was the main business of rulers, and the mailed hand seized the "sinews of war" from merchant and husbandman as a right, standing armies were easily maintained, and the slowness of movement which was an essential characteristic of the logistics of those days, rendered these armies sufficient defense. But as

civilization progressed and the truth dawned upon nations, as individuals, that the function of the military arm of the country, was to protect the classes it had formerly oppressed, and to maintain, rather than to be, the government, the standing armies which had formerly drained the resources of all continental countries, became abhorrent, and recourse was had to the practice of giving to the males of the population a military training, after receiving which they were returned to the producing classes and constituted a reserve to be called on in time of need. This being done, the calling back to the standard all men absent on furlough or detached service, the concentrating, arming, equipping, and brigading the reserve, as well as organizing the staff and constructing the various staff services, and accumulating the necessary provisions and munitions needful for the army on a war footing, constitute mobilization.

Our geographical position has hitherto justified us in taking but a languid interest in the mobilization of foreign armies, and our own mobilizations have been confined to those occasions when "boots and saddles" has rung out on the startled air of some frontier station when a force has had to be hastily dispatched to punish some breech-clouted savages, and there are few regular officers who have not sympathized with the sorely beset quartermaster on such an occasion. For on him has fallen the greatest weight of the burden of the preparation. But science has been steadily working its wonders, and electricity and steam have so contracted the wave barriers that have hitherto constituted our main safeguard against foreign invasion, that it behooves us to see what we can do in the event of mobilization becoming necessary to preserve the health of our body politic.

The Centennial parade in New York was a most encouraging sight to any man who loves his country. For *parade purposes* alone, an army, larger than our whole widely scattered regular force, came voluntarily together from the States east of the Rocky Mountains, easily and without disturbance of the business of the country; showed itself to be well equipped and disciplined, and then, having saluted the Chief Magistrate of the country, dispersed as peaceably as it had assembled, and its members, putting off their military character with their uniforms, became again Peace loving and productive citizens.

This concentration, so far as the railroad journey is concerned, was accomplished practically in sixteen hours, and reference to the

table of the organized militia, and railroad time-tables shows us that twenty-four hours would have given us fifty thousand men there, had they been needed, and forty-eight hours, many more. But, it must be observed, this concentration was not a mobilization, for it dealt only with one feature of mobilization, and that, perhaps, the simplest of all, viz. :—the personnel. It was shown that a goodly number of men, well armed, disciplined, and equipped, could be assembled, but it showed nothing with reference to the other features of mobilization, and it must be remembered that, in case of foreign invasion, but little time would be given us for preparation. Let us suppose, for sake of illustration, that, what every American, nay, every English speaking man in the world, hopes may never again come to pass, has actually occurred, and that we are preparing to meet our English cousins as invaders of our country. It must be remembered that in addition to her vast Navy, England has the right to take nearly all the "Ocean greyhounds" that ply between New York and Liverpool, for cruisers and transports, and that ten days or two weeks, at most, would suffice to land an army of the troops from her home garrisons in England, Ireland, Scotland, and Wales, at Halifax, whence uninterrupted rail communication exists to the waters of the Pacific. Let it be remembered that Canada has to-day a well equipped and organized militia force of some 37,000 men, and that, thanks to the Canadian Pacific Railroad, Winnipeg is only about thirty days from Singapore, whence an army of veteran troops from the Indian Empire can be sent against us. Add to this the fact that the passage of the Welland Canal by two or three of the light draft gunboats which England always keeps no farther away than Bermuda, would mean, owing to the treaty of 1817, practically uninterrupted water communication between the army from India, after its left had reached any point on Lake Superior, and the army in the other part of Canada, whether operating on Lakes Ontario, Erie, or Huron.* Taking all these matters into consideration it is evident that but little time would be for preparation after it had once been decided to "let slip the dogs of war." Let it also be remembered that in our Civil War, although our antagonists were rebels and had no organized forces, while what there was of the regular army, was left to us a nucleus to form on, yet many of the first force of three months' men had completed their service

* See page 14, par. 4, Report of Board on Fortifications and other defences, Ex. Doc. No. 49, H. R. 49th Congress, 1st Session.

and been mustered out before our army was considered to be sufficiently well organized to make the attack at Manassas.* And then, opposed only by hastily prepared troops, we met a disastrous defeat.

The days are passed when a thirty years war or a seven years war were possibilities. We are in the era when the duration of wars is reckoned by days not years. If this be doubted the following table will prove instructive.

Year.	War.	Declared or begun.	Decisive battle.	Days.
1859	France and Austria.....	May 3,	Solferino, June 24.	52
1864	Dano-German.....	Jan. 16,	Fall of Duppel, Apr. 18.	93
1866	Austro-Prussian.....	June 16,	Sadowa, July 23.	17
1866	Austro-Italian.....	June 20,	Lissa, July 20.	30
1870	Franco-German.....	July 15,	Sedan, Sept. 2.	49

Our last report of the organized militia showed that we have, in all, about 106,000 men, and by this time probably the number has increased to 110,000. Our regular army may be credited with an effective strength of 22,000, so that we may claim to be able to put into the field—if the personnel alone is considered—an army of 130,000 men to bear the brunt of the first attack, but any military student may be pardoned for doubting whether, in the absence of more definite plans for mobilization than we now have, this force could be so mobilized as to render available in the short time which would elapse between the inception of hostilities and the period when "arms on armor clashing," put to the crucial test, the efficacy of our Peace preparations for War.

It is not within the limits of this sketch to attempt to show what these preparations should be, but it will have done its work well if it shall interest the military students of the day sufficiently to cause this subject to be studied and debated. The more prominent militia States, New York, Pennsylvania, and Ohio, have begun upon this work within their own borders. It is to be hoped that the general attention of all military men, National Guardsmen and Regulars, may be given to this most important subject.

Observer.

* Proclamation calling for troops, April 15th, 1861. First battle of Manassas, July 21, 1861.

MORE ABOUT CAVALRY GAITS.

By CAPTAIN JOSEPH H. DORST, FOURTH CAVALRY,
Instructor of Cavalry, U. S. M. A.

I HAVE seen two battalions of cavalry, one of four and the other of five troops, that could execute, at a trot, and without a single horse breaking, all the movements prescribed for that gait by the Tactics. One had attained that degree of steadiness when I first saw it, and the other attained it only by drilling, by troop and by battalion, for nearly a year. Nothing but scouting duty interfered with drills, and, consequently, exclusive of the time they were actually marching, the men were in the saddle, daily, for an hour and a half, whether in garrison or in camp, except in bad weather, or on about one Sunday in four, when inspection was dismounted instead of mounted. The method followed to induce the horses to trot was to put them in march at that gait, and if any galloped, to reduce the speed gradually till all trotted. Of course, at first, there were some that would prance, even at a walk, but in the course of a few days they would become quiet.

For awhile the trot was kept up almost uninterruptedly during the whole time allotted for drill. After the rate was discovered at which it was easiest to make the horses trot together, it took a long time to educate the guides to fall into it habitually, and finally, as there is always a strong, though unconscious, tendency to allow a horse to gradually accelerate his speed, to preserve it. The pace was at the rate of about 6½ miles an hour for a troop, and about 6 miles an hour for the battalion. I belonged to the second battalion, and although I was habituated to the pace, I did not know what the rate of progression really was until a few days ago, when I trotted over a measured mile. In three trials the greatest variation in time from a 6½ mile rate, in trotting one mile was eleven seconds. The two battalions were thrown together more than eleven years ago, and the experience gained then and since has induced me to believe that the trot at the rate of about 6½ miles an hour—about 190 yards to the

minute—is the one which it is easiest to teach our horses to preserve steadily, when they are exercised in bodies not smaller than a platoon nor larger than a troop.

Since reading Col. Hughes' article in the March number of the JOURNAL, I have twice endeavored to compare the results of marching horses at the rate of 6½ miles and 8½ miles an hour respectively. The distance was a measured mile on an excellent and, generally, level road. The experiment on the first day was with 23 cadets, and on the second with 21 others, the formation being column of fours. In each instance, after mounting, the horses were ridden about 3 miles at a moderately fast gait to work off their freshness, then halted, quieted and started off in a direction away from the stable, with the intention of trotting a mile at the rate of 250 yards to the minute—8½ miles an hour. Before starting, the cadets were told that I wished to make an experiment, and were requested to keep their horses at a steady trot, if possible, and to keep closed. The return mile was to be at the rate of 6½ miles an hour. On both days the attempt to strike the proper rate of speed in marching the first mile was unsuccessful, the mile being passed over on each occasion in exactly the same time, 7½ minutes, or at the rate of $8\frac{3}{11}$ miles per hour (240 yards per minute). In returning on the first day the rate was very slow for four or five hundred yards, owing to an attempt to make two of the horses trot, by slackening the speed; but, finding that they would not do so, it was increased to what I judged to be the 6½ mile rate. The mile was completed in ten minutes, a rate for the whole distance of 6 miles an hour, the low rate, doubtless, being due to the decreased speed for the first quarter of a mile. On the second day the return mile was marched in 9¼ minutes, or at the rate of $6\frac{8}{37}$ miles per hour. The experiments were made with 33 different horses, none of whom had been drilled at any special rate since last fall, and 14 were new horses that had never been practised in marching at all. All, however, had been ridden daily in the riding-hall during the winter, and, at least, half the time by different men each day of a class that was learning to ride. The result of the experiments was as follows: In moving at the faster rate 5 horses galloped all the time, 6 galloped at least half the time, 3 galloped occasionally for a few yards at a time, and 19 trotted steadily. At the slower rate 2 galloped most of the time, 2 broke once and for a few feet only, and 29 trotted steadily. The new horses

were steadier than the old ones. This result might not establish much if taken by itself, but it is in accordance with the experience of many cavalry officers, extending over a period of 10 or 12 years, and possibly longer, and I have never heard of any experience to the contrary. Besides, the motion of the horse in the true gallop is such that it can be demonstrated by the laws of mechanics that it is more difficult for him to maintain his equilibrium at that gait at a very slow speed than at a fast one, and, consequently, at a slow speed his natural inclination would be to change the gait to a trot, which is safer. There is nothing to combat the conclusion, drawn from experience, that a speed of from 6 to 6½ miles an hour is the fastest one at which it is easy to make horses trot steadily, when they are in a body as large as a troop or battalion, are comparatively fresh, and have had no individual or other special training to make them trot faster. It is also about the maximum speed at which our horses and men, especially with their present lack of training, can perform with precision the movements prescribed by our tactics. I have seen a cavalry troop march in line at this speed, then wheel about by fours and halt, and then have as perfect an alignment as a line of infantry would ordinarily have if it were of the same *length*—not same number of files—and were marching in quick time, and also wheeled about by fours and halted. In this troop the file closers and chiefs of platoon always passed around the flanks.

One is inclined to believe that the cavalry troops mentioned by Col. Hughes, either had not been drilled very much or had not been carefully handled when they were drilled; and in the case of two troops in the same garrison moving at such different rates at a trot, that they had been drilled together but very little or not at all. But it is not improbable that part of the men and horses had been drilled very well indeed, and that a number of extra and daily duty men had been turned out with their troops for the inspection who had been habitually excused from drill. One restive, nervous, undrilled horse, with no matter how good a rider, can break up a line, knock a column of fours to pieces, communicate his nervousness to other horses, and cause a bad impression to be formed of the whole troop. When the inspector comes along, instead of one, it is not unusual for half a dozen or more undrilled men with such horses to turn out with each troop.

Any cavalryman knows that a prancing horse can be taken from ranks and made to trot away from his troop, or parallel to it, but if all the other horses were marched toward the stables, and he were kept alone on the drill ground until they had gotten some distance away, and he were then moved toward them, the chances are strong that he would not trot at all no matter at what speed he moved. He would not trot then for the same reason that he would not trot in ranks. A horseman would say that either the rider did not know how to manage the horse, or that the horse was undisciplined and had not been educated to submit his will to that of his rider. And this lack of training of the rider to manage his horse, and of the horse to obey his rider, is the most general and most serious defect found in our cavalry service, and of the cavalry of all enlightened nations it is found in ours only. Regular daily drills, continued for a long time, will eventually cause horses to move with a certain amount of steadiness, but the powers that control us seem to be ignorant of the fact that in order to "set up" a horse, to regulate his paces and make him handy, obedient and docile, he must be given as much, or more, individual drill and disciplinary training than a man. In order to control him after he is set up and disciplined, the rider must understand thoroughly the art of governing him, and have the skill to use it. No matter how good the rider's seat may be, the art of controlling a horse properly may be wholly lacking, and it can only be acquired by much care and patience. I think the trot at the rate of 250 yards to the minute an excellent one to adopt for our standard, but owing to the defective training of our horses, it is like the fast gallop Col. Hughes mentions, a speed for which we are not yet prepared. We can easily use it for the direct march, but for nothing else. When evolutions are attempted, unless there has been a much greater amount of preliminary training of horses and men than they now get, it is certain that many mouths will be injured, some tempers spoiled, much nervousness created and, possibly, a few curbs and spavins started. This result cannot be avoided without slurring over the drill and sacrificing steadiness and precision. And when we attempt to drill at fast gaits there is, invariably, a great deal of slurring.

I do not know how foreign cavalry horses are taught to trot steadily at their high rates of speed, or whether singly or in bodies, but the trot is, probably, taught in the riding school, and confirmed by practicing the horses together. Of course, conditions can

exist that would make it possible to train them collectively. The manner in which the weight of the shoe was distributed would affect the gait. Another matter is that of the weight carried. An animal that may canter persistently under a man weighing 130 pounds, often settles down very promptly under one weighing 200 pounds. It is customary with us to drill with no pack on the saddle, and in many instances with no arm but the saber. The carbines are left at the barracks, to preserve them from the dents and scratches certain to be received in ranks, and also both to spare the men the trouble of cleaning them after every drill, and to save them from the bruises the carbines are so apt to inflict on them when the horses crowd together. But with unpacked saddles and the troopers armed with all their weapons, the average weight borne by our horses, estimating the weight of the man at 150 pounds, would be about 190 pounds each. Now, foreign cavalry does a great deal of drilling with the saddles packed for field service, and, invariably, the saddles are thus packed at the annual manœuvres. The estimated average weight, including the rider, carried on such occasions by a horse in the French Cavalry is a trifle over 250 pounds. The weights carried in the German and Austrian Cavalry are probably no less, though I have not been able to learn what they are. It would be a remarkable troop horse that would persist in galloping very long under such a load as that.

The trot at the rate recommended by Col. Hughes (250 yards per minute) would probably be as fast as our more lightly loaded horses could be induced to go without a number breaking, for it is too near the limit beyond which they could not be kept from it. Ordinarily, most of them would gallop, when pressed to a speed of ten miles an hour, and in attempting to recover lost distance, the horses would be apt to reach that speed. But the fact that the proposed trot would require care, is what makes it desirable. It would necessitate individual training of the horse and man, it would strengthen the seat, and the attainment of precision at that speed would be excellent preparation for precision at the gallop, and, besides giving more life and vigor to the movements, it would have a greater tendency than the slower trot to cultivate in the men a proper cavalry spirit. But there are some horses in the Service that it is nothing less than torture to men to ride at a trot. They punish their riders to such an extent that the latter will try to make them canter or gallop at any pace faster

than a walk. Such horses should have no place in the cavalry. On a fast march their riders become so fatigued that they are unfit for duty when it is completed; they get to hate their horses, and will neglect them and try to break them down in the hope of getting others easier to ride. It is false economy to purchase them, and cruel to make men ride them.

But while, for many reasons, it is desirable that our cavalry should be able to execute all movements at a fast trot, it is also desirable that in forced marches they should never move at a fast trot when a slow one for a little longer time will answer just as well. It is known that in Europe they think differently and use the fast trot on the march, but there are, doubtless, many officers in our cavalry who, since the spring of 1861, have marched, under all circumstances, from forty to fifty thousand miles, or more; and in the matter of marching it would be a reflection on our own intelligence to copy the customs of foreign cavalry, for in that respect our experience is very much larger than theirs. We know that under the conditions of active field service, horses will last longer marching at a steady walk, day after day, than when walking and trotting alternately. We know that, especially in warm weather, a rate of five miles an hour maintained by walking and trotting slowly alternately, is not so hard on the horse or rider as the same rate maintained by walking and trotting fast alternately. In fast marches for long distances, especially after several previous such marches, and when the horses are weary and stiff, the fast trot is much harder for the rider than the slow trot, and a tired rider makes a horse, already tired, more so. The fast trot stiffens horses sooner than the slow trot, and it is also much more liable to give them sore backs. I think, therefore, that there should be two standard rates for the trot, the slow trot at the rate of 6½ miles an hour, and the trot for manœuvering at the rate of 8½ miles an hour.

There should, undoubtedly, be a fixed rate of speed for the gallop, and there is, probably, none more suitable than that at the rate of 12 miles an hour. The "double gallop" at the rate of 15 miles an hour would also be an excellent one for instruction in charging. Leaving out of consideration the mounted infantry instruction, the desired end of all mounted training is to be able to move in a straight line, with steadiness and cohesion, and at a very high rate of speed, in the charge. As the practice of charging as foragers has a tendency to make horses hard to keep in

hand, this method of charging should never be attempted until after the charge in closed ranks can be made in good order, and in the charge as foragers, the men should never be permitted to lose control of their horses, and the greatest importance should be attached to their rallying promptly at the sound of the trumpet.

There can be no doubt whatever, that having the guide at the centre when marching in line, is immeasurably better than having it on the flank. The chiefs of platoons should, certainly, be the guides for their platoons. They would then be no more restricted than the letter of the tactics makes them now. By the drill-book, the chief is a *fixture*, placed one yard in front of the centre of his platoon, and as that centre moves, so must he. The centre, in its turn, is regulated by a non-commissioned officer on the flank. By making the chief the guide, the platoon is an appendage to him, not he to it. As the touch would be toward the guidon in company formations, it would be necessary to have the person charged with the direction placed there. Placing the non-commisioned officer, who carries the guidon, in front of the centre of the troop on the line with the chiefs of platoon, would be an aid to them in preserving the alignment and pace. A chief of platoon would be no more subordinate to this guide than he now is to the guide on the flank of the troop. Further, a chief of platoon has no business to make any change in the gait or direction upon his own initiative. In the moment of action the captain should be charged with the gait and direction himself.

The preservation of the touch of boot to boot is impossible. The obligation to preserve the touch implies that a horse can be made to move forward in a perfectly straight line at all gaits, and that all the horses in a long line can be placed in positions perfectly parallel, and made to move perpendicular to the alignment with mathematical precision. Horses *cannot* be made to move forward in perfectly straight lines at all gaits, and perfect parallelism of the horses and a perfectly perpendicular direction in the march are also impossible. Every one who has lived on the frontier has seen the two smooth, straight, parallel paths of a quarter-race course. The horses used on them are trained for days and weeks to move along them in as straight a line as possible. If one will go over one of these paths after a training gallop of one of the horses, or even after a race, and notice the tracks made by the horse's feet, he will find that, in spite of the

training, the horse has deviated somewhat from a straight course. If a well trained horse cannot move in a straight line on a well defined narrow path, made smooth, level and straight for him, how can an untrained horse do it on an ordinary drill-ground with its inequalities and no path to guide him? The author of "The Horse in Motion" says, "while the run requires that each limb, in turn, should act as propellers and supporter in regular order, it cannot be executed at a low rate of speed, for *the base of support is confined to one foot*, and it must be rapidly adjusted to the changes of the position of the centre of gravity, for the same reason that a boy on stilts requires to be continually in motion." This makes more intelligible what follows: "*It has been observed that there is no perfect regularity in the line of the foot-prints of a running horse*, especially if the ground is uneven. This is owing to the variations of the centre of gravity, which compel the *corresponding variations of the positions of the small base which supports it;* through an instinct of the same kind which we recognize in ourselves, and make use of when we fail to give proper attention to the ground on which we are walking, and govern the movements of our feet accordingly. This we do not always do, and the effect is to cause us to stagger even when we are sober." The italics are mine. In the text, the run and the gallop are considered identical. The small base of support, one foot, and the size and weight of the horse's body, to which is added that of the rider, explains why the deviation of a galloping horse from a straight line on anything but a perfectly level floor, is inevitable. The small base of support also explains why the horse finds it so difficult to maintain the true gallop at a slow rate of speed. The centre of gravity remains unsupported for such comparatively long intervals that he is in danger of falling, and must either bring down two feet occasionally as supporters, instead of one, or must materially shorten his steps and bring his feet down in quicker succession. In consequence he will usually drop into a trot, at which gait the diagonal feet come to the ground together; but frequently, especially if of a nervous disposition and full of spirit that he has not been trained to curb, he will not trot, but keep his hind legs well under him and take short quick steps, sometimes having one and sometimes two and three feet on the ground. If he goes smoothly and quietly we call this gait the canter. If there is an unnecessary amount of action, accompanied by frequent changes of step, bounding, etc., it is probably the bastard

lope noticed by Col. Hughes. The slower the gallop the more will the horse swerve from side to side. At a very fast gallop, the great weight and velocity will make the horse keep more nearly on a straight line, but when he does swerve, no matter how slightly, the great weight and velocity will also make it more difficult for him to return at once to the proper direction, and if he is in ranks he will probably continue on the wrong course until he is thrown back by coming into contact with one of the horses next to him. With, say fifty horses in line, moving at a fast gallop, and all bound to swerve to some extent, some to one side and some to the other, and the troopers having the touch of the boot, jostling, crowding, hard knocks and excitement are certain. And in addition to this source of difficulty, there is the error of each individual trooper, small though it be, in trying to direct his horse on a line exactly parallel to that followed by the guide. The horses *must* have sufficient space for free action and a certain amount of lateral oscillation. Whether the touch of the boot is prescribed or not, in practice it cannot be maintained. But even if the touch of the boot could be preserved, the single rank would lack solidity. With a greater space between horses its solidity is still less, and in order to produce the best effect on an enemy's cavalry in the charge, it should be reinforced by another line immediately behind it, that is to say, for cavalry fighting we need the double rank formation.

Now, as to the underlying causes of lack of precision at drill and lack of uniformity of gaits. One cause is lack of proper training of horses and men, another is lack of a fixed standard of speed for each gait, and another is lack of a sufficient amount of drill with attendance of every man enforced. Another cause is, doubtless, the want of skill on the part of some officers in handling bodies of mounted troops. But if all these causes were removed, we would never be able to preserve steadiness at the gaits recommended by Col. Hughes, so long as the present drill tactics are retained. In the preparation of the tactics the temper, disposition and capabilities of the horse have been very much ignored. Placing the guide on a flank, and not having fixed rates of speed, are very serious faults, and the obligation to preserve the touch of the boot is another. But there are many more; some are slight in themselves, but when added to the others the effect of the whole is strong for bad results. Take, for instance, the matter of file-closers passing between sets

of fours when they are wheeling about. This movement of the file-closers is only barely possible of execution in good order, when the fours are in column at a halt. When they are in motion it interferes with them, and causes variations of speed. Variations of speed—suddenly slackening or increasing it—have a tendency to destroy a horse's gait, to make him break from a trot into the gallop or bastard lope. But it may be thought that this passage of the file-closers between the fours will not have any noticeable effect, for it will not occur very frequently, and we are making much out of very little. Still, it must be acknowledged that it is a violation of a cavalry principle. In addition to the slight friction in this instance, we also find constant wavering and fluctuation of speed when the troop is in line with the guide on the flank. In both instances there is, at least, a small tendency to destroy settled gaits. Now, take a troop in line, say of 48 files, put it in march at the rate of 250 yards to the minute, and execute a right turn according to tactics. It is conceded the gallop at the rate of 440 yards to the minute is about as fast a speed as we ought to use for instruction in charging *in a straight line*, yet the left file of the troop in this turn would move at the rate of 535 yards to the minute, and that, too, *on the arc of a circle* with a radius of only 60 yards. This is presuming that each man will take just one yard of lateral space in the rank; but, in truth, he will take more, and the speed on the outer flank will be actually about 600 yards per minute. This is another instance of sudden variations of speed that tends to produce unsteadiness. Now, suppose this troop to be in column of platoons, marching at the rate of 250 yards to the minute, each platoon having 16 files, and that the column be ordered to change direction. In turning, the outer flank of each platoon would move at the rate of 487 yards per minute theoretically, and more than 500 yards, per minute, in fact. After this column has changed direction four or five times in succession, the horses will be as unsteady as if they had been required to make as many charges in a straight line at the rate of 440 yards to the minute. Then form the troop in line, still keeping the fast trot, and see if you can wheel the fours about and have the file-closers pass between them without making some of the horses break into a gallop. If no horses break then, some, certainly, will after two or three more such drills.

Wheeling about by fours, marching in line, and changing

direction in column are the very commonest movements, and yet they alone will destroy regularity and order if practiced at the fast trot. If the troop had only 24 files instead of 48, and the platoon 12 files instead of 16, yet in practice they would both move at the rate of about 500 yards a minute on the marching flank in turning. Fast motion on a circle cramps a horse's action, and the shorter the radius the greater is the physical strain and risk of injury. Take two troops of equal steadiness, and let one drill according to the tactics for one hour, and the other for the same time, with the passing between fours prohibited, with the guide centre and comfortable speed on the marching flank in turning, the habitual gait being the fast trot, can there be any doubt as to which will appear to the best advantage at the end of the hour?—and every other movement or formation in which turning, marching in line, or wheeling about by fours is required, must also be faulty. If these were the only faults, they could readily be corrected by order, but the book seems full of them. Take the movement executed at the command, "Right of platoons, rear into column," etc. After wheeling to the right, the pivot file of the second set of fours in each platoon has to halt till the first set finishes a wheel to the right about on a fixed pivot. The halting of the pivot file of the second four is communicated to the men in the other fours behind him, the whole movement is jerky, and the horses' legs, mouths and tempers suffer. It is another of the movements that tends to break up a horse with fixed settled gaits. Take a troop breaking from line to the front by platoons. If there are four platoons, the third will run into the second, and the fourth into the third, before the movement is completed. Indeed, most of the time is employed in trying to prevent their colliding; this is still another source of worriment to the horses.

Is it wonderful that in a year of nearly constant drilling, troops were never able to maintain steadiness at a faster gait than 6½ miles an hour? It is certainly not our fault that we cannot get beyond movements that drag, but the fault of the prescribed drill movements themselves. The only movement we can make with precision at fast gaits is the march in a straight line, and that with only a very small front, unless the guide be centre. To require troops to execute movements at a fast trot and gallop, will not promote steadiness, but, on the contrary, destroy it. Since there is a board in session for the purpose of preparing for

us a new drill-book, it is not worth while to try to patch up our present book with amendatory orders; it is better to leave everything that pertains to the subject to that board. And it might also be a wise thing to require the cavalry officers on the board to recommend some general plan for the instruction of cavalry in all things that are peculiar to itself.

NEW COURSE OF INSTRUCTION—FORT MONROE.

By CAPTAIN W. E. BIRKHIMER, A.J.-A.,
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TO one familiar with the anomalous position of the artillery in our Army, anything which shows its determination to advance, in the teeth of adversity, must be interesting. This determination is evinced in the recently adopted course of instruction at the Fort Monroe Artillery School: an institution which, properly conducted, will, beyond question, greatly benefit the artillery, build up the Army, and add to the defensive power of the Nation.

The concentration of troops, as opposed to the policy of dispersion, is, from every military point of view, the true one, whether in Peace or War. This idea led, originally, to the establishment of the School in 1824, and there is authority for the assertion that, when organized, considering the condition of the Army, it gave promise of accomplishing a useful purpose, if maintained. But the exigencies of the Service interposed (the Seminole, Mexican and Civil Wars), and although the plan of maintaining the School was persistently adhered to, these breaks interfered with the steady pursuit of any course of theoretical instruction, although, unquestionably, this was more than compensated by the practical knowledge acquired in the field through these various causes of interruption.

At the close of the Civil War, in 1867, the School was re-established for the third time upon the old site, and for upwards of twenty years has had an unbroken existence. A comparison of the courses of study then and now will show that the Artillery School has advanced during this time with the rest of the world; at least, it has not stood still. Then the course began with elementary text-books, to accommodate certain promotions from the ranks, and appointees to commissions from civil life during the War. For the educated officer there was not much progress here, unless upon the principle that repetition is the mother of

learning. Yet a recurrence to first principles could do him no harm; but in the existing conditions of society that would be a fatal policy which, for any length of time, would subordinate the interests of the educated to those of the ignorant. The brain of man is active, and nowhere else more so than in the military profession in certain States. These set the standard for others, as, among the leading Powers of the world, the instinct of self-preservation admonishes to be up and doing if they would remain so. Fortunately for our artillery and the country, the conditions requiring an elementary course at the Artillery School have been gradually eliminated in all these years; and, however indifferent may be some of the material occasionally sent there for instruction, the great mass of officers are capable of starting, if opportunity be given, from an advanced plane founded upon the education acquired at West Point. An officer does not come educated from this latter institution. That great school, the backbone of our military system, cannot, more than others, educate one in four years; but it can, and does, give him the foundation of an education, pointing out where knowledge is to be acquired and *how to acquire it*, of necessity leaving it to the individual to say whether or not he will become educated by pursuing the course so pointed out after he leaves the Academy. The work that West Point does, pre-eminently above other institutions, is in the formation of the character of cadets, instilling a love of truth, devotion to duty, and keeping them for four years under the trip-hammer of a rigorous discipline, moulding the crude mass morally, mentally and physically into sightly and effective shape as leaders in due time of the armies of the Union.

It is in the light, therefore, of its pole-star progress that the new course at the Artillery School is to be examined. Comparing this course with that which immediately preceded, it is evident that it was with a view to qualify officers for any and all possible duties in the line of heavy artillery, that changes have been made. Law has been left out, and, considering the text-book formerly used, with advantage, for it is better to teach nothing than that which is vicious. The department of military art and science is slightly modified, the treatises on "Military Policy and Institutions" and "Ancient and Modern Armies" no longer appearing.

These are the most important if not the only omissions. All other changes either introduce new matter or elaborate the old.

Among the former is a course on Steam and Mechanical Engineering, which is susceptible of being made extremely valuable; another on the subject of interior ballistics, so complete that, if mastered, it about exhausts the fundamentals of that branch of knowledge so important for a scientific artillerist; a third includes both an extensive theoretical and a slight practical course on submarine mining and torpedoes—matters of great importance, and without a knowledge of which artillery officers, when defending the seaboard, must fall to the rear and let their work be done by the engineers. In one word, in so far as new subject matter of study is concerned, or the elaboration of old, the idea seems to be to better fit officers for the duty which, should foreign war intervene, will certainly devolve upon them. This is right, and what the artillery, to a great extent, is maintained for. To be competent artillerists is what, if possible, the officers should be fitted for. But right here comes in a difficulty. All familiar with schools, great and small, know how prone instructors are to crowd the course. They may preach till doomsday about the importance of the pupil digesting what he learns, yet rarely practice what they preach, for they seldom give him time to digest it. It does not suffice that one "go over" a certain prescribed course of study; to be benefitted he must have time to reflect upon what he studies, so, in some measure, to make it part of himself. Only the part which he thus rescues from the fleeting mass passing before his eyes does him any permanent good, except, perhaps, for the sole purpose of showing him, when occasion demands reference, where particular information is to be found. But students at the Artillery School are men. It is very questionable if men, being instructed in those things which they may soon have practically to use, and with the direct object in view of being able to use them, should ever be crowded so that the mind has not time to pause, attentively contemplate and reason upon every proposition presented to it. A few important things thoroughly learned, tend to make a man master of the situation far more than many things skimmed over superficially. Quality rather than quantity should be the distinguishing feature of his acquirements.

Examining the course from this standpoint, the thought is suggested that, perhaps, it is too extensive. Take, for instance, the subject of Torpedoes. At Willet's Point, seven months are spent in an endeavor, more or less successful, to obtain a knowl-

edge, by no means exhaustive, of torpedo and electric matters. At Fort Monroe less time is given the subject, and even during this time it is interlarded with other studies and duties.

Although some subjects before taught are now omitted, the substitution of what is new, and the elaboration of what is old, would seem, from the nature of these new subjects, to make the course in the aggregate more difficult to master. If this be true, it is unfortunate, for it was already exacting enough; though not a fact to be wondered at, because of the before-mentioned disposition of teachers to add to, rather than to take from, any course of study.

The advisability, in any scheme of instruction, of marking time at one institution on ground already gone over at another is more than questionable. It is believed to be wholly practicable to arrange the various schools, that an artillery officer goes through, so as to avoid repeating a study that he has learned in a previous one. The schools are at West Point, at Fort Riley and Fort Monroe. The former coming first should serve as a basis for the rest. Let it be taken for granted at each school that an officer knows what he has learned elsewhere and does not need to have it taught to him again. Let Fort Riley have light artillery service in all its phases, and nothing else. Rigidly confine the course of study at Fort Monroe to turning out competent siege artillerists and sea-coast defenders. As for infantry drills, and manœuvres, though it will never do any soldier other than good to practice them, still relatively they may be unimportant; and it is, at least, questionable if time devoted to them at Fort Monroe would not better be employed in prosecuting purely artillery subjects. Artillery officers have now, and for years are likely to have, all the infantry drills at their regular posts that are necessary to keep them and their troops in training. Retaining the "setting up" exercises of the infantry tactics, ii is believed that it would be well to banish from Fort Monroe every branch of study except that which, either directly or collaterally, tends to make competent siege and sea-coast artillerists.

It is but too true in the line of the Army that the ignoramus, when once influence has secured him a commission, goes right along in his promotion at even pace with the most capable and diligent. That same influence may, and often does, secure him preferment. *It is a commentary upon the wretched defectiveness of the laws that the "student officer" may fail with impunity satisfactorily to pass*

this carefully arranged course of study, and yet the next day be promoted to a higher grade. Such scenes have been witnessed. It is greatly to be desired that, as at West Point there should be some legal sanction to the course so that, when they fail at examination, the incompetent and deficient may be weeded out of a service which they only disgrace.

But, after all, courses of study go for little, unless there be competent instructors. The blind leading the blind is a melancholy spectacle; the blind leading him who has fairly good eyesight is more melancholy still. "By order" is all potent in the military service, yet its power has limits in the nature of things. There is a suspicion abroad that its magic influence cannot call forth either ability, attainments or capacity to instruct where none existed before.

The proposed course at the Artillery School is sufficiently elevated to gratify the most ambitious. He who masters it may well feel that he has done all he could to prepare himself to meet the just expectations of government in this particular. The more to be deplored is the fact that when the artillery officer leaves this School he has no field in which to put knowledge there acquired to practical use. The course of instruction is for the artillery as it should be, a scientific corps, and not as it is, a body alternately mere gunners and then red-legged infantry. The course is one which might challenge the energies of the ablest ordnance officer—the scientific artillerists proper of our Service. These facts do but set out in bolder relief the necessity that exists for re-uniting the ordnance and the artillery in a proper scientific corps of artillery—one of the great bulwarks of the Nation.

Until then we can only bid those Godspeed who, with devotion illy requited, labor to build up the artillery arm.

Vancouver Barracks, W. T., May 13th, 1889.

THE INFANTRY IN THE FIELD.*

(A Lecture delivered before the 12th Regiment, N. G., S. N. Y.)

By FIRST LIEUTENANT JOHN P. WISSER, U. S. A.,

First Artillery.

THE two subjects here included, Marches and Outposts, are but branches of the general subject of Minor Tactics, which includes the movements of troops on the battle-field and in its immediate vicinity, and the methods for securing the safety and preserving the active power of the Army, on the march, in camp and in battle.

Minor Tactics is to-day the great subject of study and practice in the European armies. The value of such study was evinced in the Franco-German War by the energy with which the German officers conducted their reconnaissances; and, indeed, a large majority of those who received honorable mention in general orders were those who had charge of "officers' patrols."

To the careful reader and observer it must be evident, that in the opening days of our Civil War, there was quite a general lack of knowledge of the principles of Minor Tactics, even so far as the simple duties of outposts and patrols is concerned.

At the beginning of the War, when the Army of the Potomac was forming about Washington, in 1861, General De Trobriand† thus describes the state of affairs:

"On September 20, the command of the grand guard of the brigade devolved upon the major of the Fifty-fifth, an officer

* Practice marches constitute an excellent training for troops in time of Peace, since it is so important a duty to march in the presence of the enemy, and one of the first to arise in actual War. It is hoped, therefore, that the principles here set forth may, in a general way, serve to guide those who desire to conduct such exercises in the National Guard. Those who desire a more intimate acquaintance with the subject will find it advantageous to consult the following works:

Elements of the Art of War,	Mercur.
The Elements of Modern Tactics,	Shaw.
Die Elemente der Taktik,	Meckel.
Die Taktik,	Waldstätten.
La Guerre Moderne (Tactique),	Derrécagaix.

(Translated into English by C. W. Foster.)

† *Four years with the Army of the Potomac.*

zealous in all the details of the Service, which he had learned in the ranks of the National Guard, at Strasbourg. The lieutenant of the company of Zouaves was sent, during the night, to make the grand rounds, and he stated in his report, the next morning, that he had entered the camps of twelve regiments, without being stopped, or even challenged, walking around freely everywhere with his men."

And, later on, in March, 1862, when he himself was field officer of the day, of the division, he reports, "that the Service was dangerously insufficient in front of the enemy; that the camps were poorly-guarded, or not guarded at all; that the pickets were placed without any regard to connecting; and that the posts were so separated, one from another, that they could be carried off by the enemy before any one knew of his approach."

The battle of Chancellorsville was lost by the failure of the commanders, in one or two instances, to apply the principles of Minor Tactics. Properly advanced outposts would have discovered Jackson's flank march, and given ample time for preparation. "A single picket, sent for a mile up a broad road, would have discovered the whole movement in ample time."

These examples may be indefinitely multiplied from history, but will be sufficient, as they stand, to indicate the importance of the subject before us.

The duty of marching in the presence of the enemy, and of establishing outposts, is one of the first required of troops in an actual campaign, and yet it is seldom practised in time of Peace in our country. All the *principles* of Minor Tactics can be learned in time of Peace, and, however useful actual War may be, it is well to remember that when Germany measured her strength with the war-veterans of Austria and France, she had had no War for fifty years. So that, apparently, well-conducted, systematic study is sometimes more valuable than actual (but thoughtless) practice.

I. MARCHES.

Marches constitute the most fatiguing work in War. In a long campaign the marches deplete the ranks more than the losses sustained in battle or skirmish. The art of marching properly consists in so managing the powers of a body of troops, under ordinary circumstances, that an extraordinary effort can be made at any desired moment.

The conditions to be fulfilled in the organization of the columns of march, in order best to economize the strength of the troops, are not always readily assimilated to the tactical and strategic requirements resulting from the military plans and preparation for battle.

The latter conditions predominate in marches in the presence of the enemy, the former in ordinary route marches. Marches in presence of the enemy differ in some requirements from ordinary route marches, and require much in addition. They require outpost duty, which is very fatiguing to the troops; the daily marches vary considerably in length, according to the circumstances; the larger subdivisions (even divisions) must remain intact in a single column; the different arms are arranged in the separate columns in the order in which they are to come into action; finally, the light field train (first echelon) marches with the troops, while the heavy train (second echelon) marches at a considerable distance (one-quarter to one-half a mile) in rear, in case of forward marches, ahead in case of marches to the rear, and on the least exposed flank in case of flank marches.

In most marches, the problem resolves itself into moving considerable columns of the troops with their trains safely, rapidly, prepared for battle, and with the greatest possible economy of strength, often for many days together.

The success of the operations depends largely on the manner in which the marches are executed. The movements of large bodies of troops require very careful calculations. *All* the roads in the vicinity of the Army are almost continuously covered with troops or trains, and any neglect of a commander leads to interruptions in other columns, which place them in a position where it is no longer possible to make any calculations on their movements. A body of troops on the march, should preserve its own proper depth of column, it should march at the rate prescribed or cover the distance ordered, the march of the column should fulfil the requirements of preparedness for battle, and the troops must march with the greatest possible economy of strength, so as to reach the terminus in full strength of numbers and ready for battle.

Ordinarily, dismounted troops march in column of twos or fours, cavalry in column of fours, guns and carriages in general in single file. A company on the war footing requires 500 feet in depth, a squadron 150 feet, a battery 400 feet. In order to avoid

the effects of slight fluctuations in the rate of march of the different parts of the column, and which are very tiresome to the troops, a certain distance is left between consecutive subdivisions. Thus, in rear of a company, ten paces, in rear of a battalion, squadron or battery, twenty paces, and in rear of a regiment, forty paces.

The principal factors influencing the march, are the character of the country, the character of the roads, defiles, the season of the year and the weather, the length of the columns of march, and, finally, the discipline of the troops and their training in practice marches.

The rate of march varies somewhat with the length of the march. Thus, a march of four miles can be executed by infantry, under normal conditions, in one hour, or even, if necessary, in fifty minutes, and by cavalry and artillery in forty minutes; while a march of fourteen miles requires five or six hours for infantry, four hours for cavalry and from four to five hours for artillery. In field marches of long columns of all arms the average rate, including halts, is about two and one-third miles in one hour.

The length of the march varies according to the circumstances. An *ordinary* march is fourteen to eighteen miles a day, resting every fourth day. A *rapid* march is twenty-three to twenty-eight miles a day, continuously, without a day's rest, for a period not exceeding five or six days. A *forced* march continues till the object is attained, the only halts being such as are indispensable. With infantry, such forced marches cannot be carried beyond forty-five or fifty-five miles, without exhausting the troops, and rendering them unfit for battle. Cavalry, and to a certain extent artillery, can increase the length of the daily march as well as the rate of march, so that good cavalry can readily march thirty ($18\frac{6}{10}$ miles) to thirty-five kilometres ($21\frac{7}{10}$ miles) per day for several days, or even fifty kilometres (31 miles) with experienced troops. Columns of all arms march according to the rate of foot troops. In case of divisions it will be necessary to add ten minutes to every hour, as a factor of safety, to the rates already given, and under unfavorable circumstances the time required may even be doubled.

The preparedness of a column of march does not depend on the preparedness of the individual soldier, but on the *out-posts* and the *tactical order* of the column. The latter only is considered in this connection.

In the larger columns, composed of several arms, the *tactical* considerations require that the different arms be arranged in the order in which they will come into action. Hence, first the cavalry, then a small part of the infantry, then the artillery followed by the rest of the infantry, and, finally, the trains. The *administrative* considerations require the same arrangement, but, in order best to spare the troops fatigue, the arms should be separated on different roads. The relative weights attached to these conflicting considerations will determine the order of march.

The order of march of a division will illustrate the principles here discussed.

The advance-guard consists of:

1 Regiment of Infantry.
2½ Squadrons of Cavalry.
1 Battery of Artillery.
1 Company of Pioneers, and
⅓ the Divisional Ambulance Corps.

The order of march is as follows:

1 Platoon, 1st Squadron.
1st Battalion, 1st Regiment.
1st Battery.
2d Battalion, 1st Regiment.
3d Battalion, 1st Regiment.
Battalion Ammunition Wagons, 1st Regiment.
Company of Pioneers.
⅓ Ambulance Corps.
2d echelon, 1st Battery.

The rest of the cavalry of the advance-guard is pushed to the front.

Between the advance-guard and the main body there is an interval of 2,000 paces.

The main body is composed of:

1 Regiment of Infantry.
1 Brigade of Infantry.
2 Platoons of Cavalry.
3 Batteries.
1 Company Pioneers with bridge equipage.
⅓ Divisonal Ambulance Corps.

The order of march is as follows:

1 platoon, 3d Squadron.
1st Battalion, 2d Regiment.
2d Battalion, 2d Regiment.
3d Battalion, 2d Regiment.
Battalion Ammunition Wagons, 2d Regiment.

2d Battery.
3d Battery.
4th Battery.
1st Battalion, 3d Regiment.
2d Battalion, 3d Regiment.
3d Battalion, 3d Regiment.
1st Battalion, 4th Regiment.
2d Battalion, 4th Regiment.
3d Battalion, 4th Regiment.
Battalion Ammunition Wagons, 3d and 4th Regiments.
Company of Pioneers and bridge equipage.
½ Ambulance Corps.
2d echelons, 2d, 3d and 4th Batteries.

Between the main body and the general train there is an interval of 2000 paces. One platoon of cavalry acts as escort for the train.

Large bodies of troops march, whenever possible, in several parallel columns, but a division only divides in case it finds parallel roads on either flank in the line of march, not more than 2000 to 3000 paces apart.

The direction and terminus of the march are usually indicated by towns, villages, etc., in the order for the march. The latter should also include the order of march of the troops (when necessary), the hour of breaking camp and of arrival at terminus, the localities where the long rests are to take place, as well as their length, directions as to the cooking supply and issue of rations, outposts, the whereabouts of the commanding officer during the march and the night headquarters, and, finally, all necessary measures and information bearing on the object to be attained. For subdivisions as large as a division written orders for the march are issued, but for smaller subdivisions verbal orders to the commandants of subdivisions are all-sufficient.

Rests of one hour are ordered in marches of over 15 kilometres (9.3 miles), when about half the distance is passed over. These are the *long* rests above referred to. In short marches the troops may rest five or ten minutes every hour, and dispense with the long rest.

As a column on the march approaches the enemy, the separate parts close up, and, if the roads permit, broader formations are adopted.

2. OUTPOSTS.

Outposts in general include advance guards, rear guards and flank guards, and outposts proper. The general object of out

post duty is to preserve troops, on the march or at rest, from observation by the enemy, and to enable troops to pass to the formation for combat at the proper time and place and with the proper degree of preparedness, or to withdraw from battle at the proper moment without danger.

Patrol Duty.—The duty of patrols in this connection is to complete the outpost duty in camp or on the march. Their movements are entirely dependent on the movement of the main body from which they are detached. Patrol duty belongs to cavalry, but in its absence it must be performed by infantry.

The command of the patrol is by voice, but attention may be called by means of a whistle. The general signal throughout the Army to indicate the presence of the enemy is the waving of the cap over the head.

The order of march of the cavalry patrol is based on the fact that the patrol is for the time being an independent body, and must be prepared at all times for any emergency. It, therefore, moves prepared for battle, the loaded gun on the shoulder, silently, quietly and alert.

The rate of march should be rapid.

The order of march is not fixed, nevertheless certain guiding principles may be determined. The most natural order is the *flock* order, in which the patrol is concentrated in a small space, and thus can hide readily and is always well in hand, prepared to fight at any moment. The chief is at the head, two men are close to him, one at either side, the patrol follows at ten paces distance, in single file, by twos or by fours.

When the patrol enters a space where the view is more confined, the depth of the formation is increased, pairs following one another at 50 paces distance. The total depth should not exceed 200 paces in case of small patrols, 300 paces in case of large ones.

From time to time the chief sends two men (generally the two at his side) toward one or the other flank or to the front, with brief directions, such as, "R. and M. to the bridge," or, "On the height, look about," or, "Pass around the inn," or, "Move towards the woods."

The advance of a patrol proceeds by short advances and halts, alternately. The interval during which the pairs stand still is employed in careful observation, and to allow the patrol time to assemble again.

Infantry patrols march according to the same principles as cavalry patrols, but with a difference due to the differences in the characters of the respective arms. Infantry is not expected to move with the same rapidity as cavalry, nevertheless, it should move, relatively, rapidly; moreover, cavalry notes only the larger relations, infantry must look with greater care at the details; cavalry may allow itself to be seen, infantry should remain hidden.

The infantry patrol marches usually on the main roads, but in the immediate vicinity of the enemy, as in battle, side roads are used.

The patrol advances by successive steps of 100 to 300 paces. Thus, the patrol stands in line of skirmishers, guns at a ready, and a view round about is quickly taken, especially in the direction of the line of march; then it advances, in line, rapidly to gain the next cover. Whenever it is necessary to leave cover and pass into the open, a careful survey is first taken. In the open sudden attacks by cavalry are most to be feared, hence the patrol remains concentrated. In covered ground, scouts are sent out some 20 or 30 paces ahead, often accompanied by the commandant.

Every observation of the ground is made standing. Thus, two men were sent ahead at the fork of a road some 50 paces to the right, where they had a good outlook. The commandant of the patrol closes it up, marches on, and is finally followed by the men previously detached.

The commandant usually marches with two men, 10 or 20 paces in advance, and advances with caution, approaching a cross-road or a rise very gradually and with many precautions to prevent surprise. He goes to points of observation within 200 or 300 paces of the line of march, in person, or sends thither the two men at his side.

Every man is required to observe the points of the landscape, in order to direct himself readily in the future. All traces of the enemy are, of course, carefully searched for and noted.

A. OUTPOST DUTY ON THE MARCH.

For the security of troops on the march, the advance guard, rear guard and flank guard are designed. In marches to the front, the advance guard is the principal source of security, in marches to the rear, the rear guard, and in marches by the flank, the flank guard.

Large bodies of troops protect themselves, usually, only on the side towards the enemy, exceptionally, however, on two sides, front and flank, or rear and flank. Smaller bodies may be entirely surrounded.

Large bodies moving in several columns on parallel roads, have no common advance guard, but each column has its own, of strength proportional to the strength of the column. In such cases flank guards are necessary, except for the outer column on its threatened flank. In very deep columns, the advance guard takes a *broad* formation, but these flank guards are not to be regarded as flank guards of the main body, but merely as part of the advance guard.

Weak detachments, composed of all arms, usually detach only cavalry for protection. Large detachments employ, at least, infantry and cavalry, and, in case there is more than one battery, at least one of these is also detached. A single battery, however, should not be split up, but should remain entire with the main body. The strength of all the detachments for the security of a column varies from one-sixth to one-third of the total strength.

The advance guard, the rear guard, and, occasionally, also the flank guard, have each their own commander, who is directly under the commander of the main body.

The advance guard, the principal organ in securing the safety of the troops, besides its reconnaissance duty, is also charged with the general duty of all outposts—to come into action and fight until the main body can make its proper dispositions. When the enemy is reached, the advance guard reconnoitres his position, determines his forces, and takes up a position such that the main body can deploy in safety.

The composition of the advance guard, in marches to the front, is determined from the principles just discussed. There is no fixed rule to follow in any particular case. A squadron detaches a platoon, a battalion a company, a mixed command usually detaches nearly all its cavalry to the advance guard. The proportion of cavalry and infantry depends, however, on the character of the country: in open country more cavalry is employed, in very difficult country, more infantry.

Every advance guard, larger than a company or a squadron, detaches a *head*, or *vanguard*, from the *main body*. This head

(or vanguard) is the true member of reconnaissance, while the main body is for combat.

The vanguard forms a chain and detaches independent patrols. The chain is composed of small detachments and patrols, which reconnoitre the ground to right and left, so as to prevent the enemy from penetrating without being seen. It is composed, in general, of one squadron.

The principal part of the vanguard constitutes the *point*, which detaches an *extreme point* on the main road, and detachments or patrols of *flankers* to right and left.

The extreme point is composed of a platoon of cavalry (or infantry) and sends out scouts (generally three men and a non-commissioned officer) to clear up the main road, and the ground to right and left for 1000 paces (500 in case of infantry). The flankers work beyond that. The detachments of flankers are usually ½ to 2 platoons strong, the patrols comprise from 3 to 12 men. These subdivisions detach scouts aud flankers to clear up the ground and keep up communication.

The point follows the extreme point in closed column at about 500 paces. If the head is stronger than a squadron the main body of the head marches 500 to 1000 paces in rear of the point.

The main body of the advance guard is composed, in general, of the infantry and artillery of the advance guard. It remains at a fixed distance from the main body of the column, the distance depending on the strength of the advance guard. The advance guard of a division may be ¼ mile, or more, ahead, small detachments usually a distance equal to their depth of column, but the minimum distance should be such, that in case of a rencontre, the main column will not be immediately under fire.

Ordinarily the detachments and patrols of flankers of the advance guard, and the independent patrols, suffice for the protection of the flanks, but when one of the flanks is particularly threatened a special *flank guard* is made use of, drawn usually from the main body of the column. Flank guards march on roads parallel to the main road; they have their chain covering front and flank, and keep up communication with the advance guard by means of patrols.

B. OUTPOSTS PROPER.

Outposts proper are detachments of troops thrown out by an

army at rest, covering the approaches to it and guarding it against surprise.

Every large system of outposts in modern armies consists of three parts:

1. A line of *small posts** (Fr. *petits postes;* Ger. *Feldwachen*), with their sentinels and patrols.

2. A line of larger groups, called pickets.†

3. A line of still larger groups, the reserves or main bodies of the outposts.

(1.) *Small Posts.*—The rôle of the small posts consists in observing the ground in front by means of their sentinels, in clearing up the ground, for a short distance, by means of their patrols and in offering the first resistance in case of attack.

Every small post detaches a certain number of sentinels in the direction in which the enemy is liable to present himself, in such wise that nothing can cross the chain of sentinels or approach the small post without being discovered.

The small post proper consists of the men not posted as sentinels nor detailed to patrol; it serves to relieve the sentinels and patrols, and to resist an attack if need be.

The sentinels are usually double sentinels, *i. e.*, composed of two men each.

The patrols, generally composed of three men, are sent out to clear up the country for a distance (in case of infantry) of $\frac{1}{8}$ mile (950 m.). On dark nights, in covered ground and in the immediate vicinity of the enemy, infantry is generally preferred.

A *small post* is usually a platoon of infantry (peace footing), consisting of 1 officer, 4 to 6 non-commissioned officers, 1 bugler and 30 to 40 men; also several mounted men as orderlies.

The sentinels are placed some 200 to 400 paces (160 to 320 m.) apart. The whole extent of front covered by a small post is from 800 to 1000 paces, each furnishing three double sentries. There should be, at least, three reliefs to each sentinel's post, and no sentinel should be on post more than two hours at a time.

(2.) *Pickets.*—The pickets constitute for the *small posts* solid centres of resistance. They are intended to support or take up the latter. They are, so to speak, the pillars of the outpost

* Pickets. Mercur.

† Supports. Mercur.

position; the enemy's efforts must be here resisted till the arrival of the reserves of the outposts.

The pickets are composed mainly of infantry; their strength is about one company (200 men). The pickets are usually formed of the remainder of the company which supplied the small posts. A company furnishes, usually, two small posts. The distance between the small posts and the pickets is about 400 to 800 paces, in case of infantry outposts.

(3.) *Reserve.*—When it is necessary for the outposts to occupy strongly a position, it is essential that the main mass of the troops composing the outposts may be available at the point where the principal attack shall be made. With this object in view, a half of the forces of the outposts is held in reserve and placed behind the line of outposts, where it can readily support an attack on any point, especially on the most probable points, viz., the principal roads.

The reserve constitutes the centre of resistance, and is expected to support the lines in front of it, and to relieve them. It is composed of all arms.

Posting the Outposts.—The strength of the outposts should be only what is strictly necessary; it will depend on the strength of the command to be covered, the nature of the terrain and the extent of the line to be occupied.

At the end of a march the outposts are generally furnished by the advance guard (or the rear guard in case of retreat). Large advance guards (advance guards of divisions and over) use from one-half to one-fourth their strength for this purpose, the remainder bivouacs behind the reserve of the outposts as main body of the advance guard. In case of smaller advance guards, the main body of the advance guard is also the reserve of the outposts. The extreme limit of the outposts in strength is one-third of the total force.

The best position for the outposts is that which requires the least number of men, hence, a position is advantageous when it presents only defiles, or when it is entirely open. This position should effectively cover the main body; it should present strong centres of resistance, be masked from the enemy, the parts should be mutually supporting, and the flanks should rest on the centres of resistance or on difficult ground. The kinds of points to be occupied to resist an attack are cover (farms, clumps of woods, edges of villages and of woods, etc.) and lines of heights.

If the ground permits, these points are best occupied by the *pickets*, if not, by the *small posts*, the pickets being then placed close up to the small posts so as to support them readily.

All the troops of the outposts are under the command of the commandant of the outposts, Based on the instructions received, and a rapid examination of the map, he issues his order (usually verbally) for the establishment of the outposts.

This order contains a general view of the situation, and the object to be attained, the general position of each subdivision, the sector of each *small post*, and the general orders for the patrols, directions for conduct in case of attack, finally, the reports required, the mode of installation, the mode of obtaining supplies, etc.

As soon as the position is occupied, the commandant inspects it, modifies it and gives his directions for the night position. The actual change to the night position is never made till after dark, but the pickets and small posts for the night position may take their plaees and make themselves comfortable before dark. At dusk the commandant visits the night position. Generally, he remains with the reserve.

The officer in command of a *small post* should be provided with paper and pencil, a watch, and, as soon as possible, with a convenient map. After having inspected the arms and ammunition of his command, he advances to the sector assigned to him, patrols preceding, the small posts with their proper intervals following on a line. The troops are halted on the proper line, and the sentinels are posted while the patrols cover the movement, halting at a designated distance in front till the line is established.

The sentinels may be posted in two ways: the officer either takes half the command, posts the sentinels from the right and gives each his orders, while the other half remains under arms ready for combat, under the senior non-commissioned officer; or, the sentinels are sent to take their own places, which are merely indicated to them in a general way, the officer afterwards inspecting them and giving them their orders. The latter method is preferable as a rule.

The sentinels should be posted economically by taking every advantage of the ground; they should be screened from the enemy's view, but have a clear field of view themselves; they should be mutually supporting and well connected with their

respective small posts; and they should not be more than 500 paces apart. During the night they are generally placed in low ground, so that figures on the heights will be projected against the sky, or in front of villages or woods, so that these strong points may be held, and they should patrol from post to post.

The positions of the small posts should be defined, should be behind the centre of the line of sentinels or behind the most important points, should be as near as possible to a road, and should be favorable for defense.

During the day, patrols are sent only in the directions by which the enemy may approach, under cover, but at night the entire terrain is beaten up, especially the roads. Certain routes are designated for the patrols, one or two by day, three or four by night, and the same men always take the same route. Three patrols are designated for each route, which relieve one another, so that there is always one in motion.

The small posts are relieved daily from the pickets, either at break of day or before night-fall. Each picket has its picket guard. The reserve is in camp with a camp guard around it.

At night the line is, in general, drawn in closer, but the outposts on the roads are pushed out farther. If the command arrives in position just before night-fall, the position for the night is taken up at once, if after night-fall only the main outposts are sent out on the principal roads.

Reprints and Translations.

"MOUNTED INFANTRY—ITS PRESENT AND ITS FUTURE."*

By MAJOR E. T. H. HUTTON, D.A.A.G., KING'S ROYAL RIFLES,
COMMANDING THE MOUNTED INFANTRY REGIMENT.

"For I profess not taking; only this,—
"Let each man do his best."
First Part HENRY IV.

I.

INTRODUCTORY REMARKS.

BEFORE entering upon my subject I wish to make it quite clear to my audience that I submit the following paper in no spirit of controversy, and I deprecate any supposition that the subject of my paper is in any degree in opposition to any one arm of the Service. The title might more aptly have been stated as "The more extended use of Infantry in Modern War," and I repudiate the assumption that the functions assigned to mounted or mobile infantry detract from the value of, or the necessity for, the sister arm of the Service.

Each of the three arms of the Service, *infantry cavalry and artillery*, have their distinct and well defined duties to perform. The action of one must be incomplete without the joint action of the other two—this was most ably shown in a lecture here by Colonel C. B. Brackenbury. To give artillery the increased mobility desirable to act with cavalry, all armies have their horse artillery batteries; to give infantry the necessary mobility to act with cavalry, this country has now its mounted infantry, and in this respect has taken the lead of all Continental nations.

I am thus anxious to anticipate any statement that it is the intention for mounted infantry to usurp the functions of cavalry more than they do the functions of horse artillery by the action of their attendant machine-guns. It is as imperative that mounted infantry should preserve their identity as infantry as that cavalry should preserve theirs as cavalry, and the rôle of each is equally distinct. The degree of training given to the officers and men should be a sufficient guarantee that infantry mounted for the time can never overstep the work which they can legitimately be called upon as, "mobile infantry," to perform.

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ERRATUM.

Page 340.—In first line quotation (Shakespeare) "taking" should read *talking*.

Much criticism in this country, and on the Continent, has been raised upon the general question of mobile infantry, and I propose to enter at some length upon this point.

But with reference to the system of organization, training, and detail of equipment which have been adopted at this station for the purpose of carrying out the mounted or mobile infantry idea, I trust that my audience will forgive me if I remind them that it is neither fair nor just to pronounce opinions unless they are in full possession of all the facts which have governed the introduction of mounted infantry into our Army, and unless they are thoroughly conversant with the whole system or organization and training which has been carried out, and its effect towards the attainment of the object in view, viz., the creation of a mobile infantry. Few can realize the enormous difficulties which have had to be surmounted in order to carry out the principles of a mobile infantry, as stated above, with any reasonable hope of success.

Criticism upon any new scheme or idea is very simple, but critics must be prepared to build up if they are going to pull down. "*La critique est facile l'art est difficile*" said Von Müffling.

It must be borne in mind that the mounted infantry, organized here, are trained for the express purpose of being utilized in large bodies, and it requires no argument to show that large masses of mounted troops, without the power of rapid and precise movement, are useless.

Put aside, therefore, gentlemen, any narrow view of the question now before you, and consider solely and entirely the general advantage to any army which a mobile and rapidly moving infantry, such as I am about to describe, must, necessarily, confer, and consider carefully whether this country may not be considered to have taken the lead in Europe by the present institution of mobile or mounted infantry, and thus utilizing to the full the peculiar genius of our Anglo-Saxon race which possesses, in so remarkable a degree, those qualities of which we are so proud to credit ourselves with, viz., a love of horses, a spirit of adventure, and an adaptability to all circumstances. A distinguished Prussian officer, known to many of us, Colonel Von Hagenan, after the Delhi manœuvres, in 1886, expressed himself as follows, in a lecture upon "The English Army," at Berlin:—

"The truth is, the different arms of the Service in the English Army are not sufficiently closely united. There is too much caste spirit; they fail to perceive that each only exists for the other, and that the efficiency of an army is measured by the product, not the sum of the efficiency of each arm."

Taking to heart, then, the criticism which I have stated, let us consider the question of "mounted infantry," "mobile infantry," if you will, from the broad stand-point of how it affects the general efficiency of the Army as a fighting body, and not as it affects any individual unit or arm of the service.

II.

THE RÔLE OF MOUNTED INFANTRY IN MODERN WARFARE.

The absolute necessity for the dismounted action of mounted troops, or

of foot soldiers possessing a high power of mobility, has been felt in all ages, and under Napoleon especially, the continual endeavours to produce a dragoon for this service were singularly persistent. The attempt failed under Napoleon, as such attempts must fail when the equipment and the training of the men is inconsistent with the rôle expected of them. The dragoons of those days were permanently organized bodies of horsemen, who, with all the characteristics of cavalry, had, in addition to a cavalryman's weapons an infantry soldier's firearm. It was hardly surprising that, as time went on, the officers and men discarded the comparatively uninteresting rôle of infantry for the more dashing and adventurous rôle of cavalry.

If the necessity for the effective fire of mounted troops was felt in the days of smooth-bore muskets available only at 150 yards, how much greater must be the necessity in these days of long range magazine rifles, when the power of our infantry weapons can make itself apparent at 1400 yards, and shows itself more and more deadly as distances decrease. Consider the vast importance of the fire effect of an infantry force pushed rapidly to the front to anticipate the enemy in a village or upon a point of vantage. Such a force, if handled with enterprise, can maintain itself until the very last, knowing that, its opponents arriving at 200 yards distance, it has only to mount and retire at a rapid pace to escape the consequences of an unsuccessful defence. Remark the difference between the fire effect now and that of eighty years ago, when the fire of the dragoon was only effective at 150 yards. Why, in the face of an overpowering attack, time was not given to the lesser body, no matter how cool and determined, to make its fire effect felt before the necessity for retreat would drive them to their horses to avoid the fatal rush of their opponents. Napoleon, in his day, laid down that the strength of an army is like the power in mechanics, viz., that it is estimated by multiplying the mass by the rapidity. He would, I almost think, had he lived now, have likened it to the striking power of a body in movement, the mass multiplied by the square of its velocity.

It may be urged that this dismounted action is the peculiar duty of cavalry alone, who are now trained to act on foot. An able English writer in his "Cavalry in Modern War," thus replies:—"In acting, dismounted, care must be taken that the cavalry does not become mere mounted infantry, which is the last thing to be desired. All that is demanded from it is limited to its being able, when occasion may require it, to render such services. It is no part of its duty to undertake or be drawn into long sustained combats, or attempt, when dismounted, to cope for any length of time with the enemy's infantry. Cavalry soldiers, horse and man, are too valuable to risk in an infantry combat, neither can be replaced without extreme difficulty, whereas mounted infantry are always obtainable."

The rôle of mounted infantry may be summarized as, mainly, offensive. When an enemy has occupied villages, buildings, coppices, defiles, or bridges, which cannot be turned, when nothing can be effected by the mounted action of cavalry, mounted infantry may be usefully employed. With horses or ponies, linked or held in some secure or sheltered spot, the infantry soldier, with his magazine rifle, and careful training in musketry, is able to

deal with an enemy's infantry in a manner which cavalry, armed with carbine, and equipped for mounted service only, could not hope to attempt. Again, upon the field of battle, mounted infantry thrown forward with the dash and spirit of initiative in action, a characteristic of British troops, should be able to seize and hold important points of vantage, and by their fighting power should be enabled to deny them to an enemy's infantry. Mounted infantry. under such circumstances, must be prepared to treat their horses or ponies as mechanical contrivances to enable them to reach a point of vantage, which, once gained and held, may secure victory to their general, and they should be prepared to sacrifice their horses accordingly. It is at such a crisis, when the joint effect of field guns and mounted infantry would tell most conspicuously.

I venture to think that if the Prussians had had a force of mounted infantry to push forward, the battle of Vionville would have been less critical. In pursuits and in retreats there must always be a wide scope for the action of mounted infantry.

I need hardly remind my hearers of the events and experiences of recent campaigns, and how, that owing to the increased range and precision of modern fire-arms, the action of cavalry upon the field of battle has been much curtailed. If cavalry, however, have suffered by their utility upon the field of battle being decreased, they have immeasurably gained by the vast field of independent enterprise which is now open to them. The Americans in 1862–64 showed the way, and in 1870 the Prussian Uhlans, to a limited extent, followed suit. On all sides, in 1870, the Prussian cavalry, enterprising as they were, showed themselves behind the American cavalry leaders in their appreciation for rifle fire as a necessary and indispensable part of their rôle. It is a matter of history, that over and over again the redoubtable Uhlan was held in check by the determination of a few Franc Tireurs until, by dire necessity, they took to arming themselved with the Chassepots taken from their enemies. The lesson, of course, has now been learnt, and the German cavalry now carry a carbine; but are they any the better able to cope alone with an enemy's infantry? General Sir Henry Havelock-Allen, in a very able and valuable pamphlet, entited "The Three Leading Military Questions of the Day," published shortly after his return from the American War in 1886, was, perhaps, the first military writer of our country to point out the vast importance of the new departure in the use of mounted troops made by both sides in the American War of Secession. Sir Henry Havelock-Allen's view upon this subject, read by the light of our present development of military expediency in this respect, reads almost like a prophecy.

Let me now quote the best known German military writer of the day, Prince Kraft of Hohenlohe-Ingelfingen, which bears directly upon the question before us; he says:—

"In our later wars (*i.e.* since the Seven Years' Wars) the pursuit of cavalry came to a stop as soon as they lost the certainty that they were followed by the infantry.

"We find that, in the long run, cavalry can be independent only when it is employed in connection with infantry, just as, on the other hand, in-

fantry never feels itself secure unless it is in connection with cavalry. The reciprocal support of the three arms in these days is more necessary than ever.

"Can a cavalry division at the end of a forced march (say of 30 miles), reckon upon being able to overcome an infantry battalion on the same evening? Are 1400 carbines sure to obtain a rapid victory over 1000 rifles? Certainly not.

"A cavalry division can afford very few more men than an infantry battalion for dismounted action, and will always be inferior to the infantry in their firearms and musketry training."

Here we have the views of the most prominent German military writer of the day.

I will now, with your permission, add the opinions of the most prominent English military critic of the day, viz., Colonel Maurice, who, in his article on "War," says:

"There is, however, another necessity of modern warfare, which is altogether distinct from the question of supplying firearms to cavalry in order to make up to them for the increased power of infantry. Powerful as modern infantry is, it is very slow in its movements. Hence, the idea of mounting infantry, and of sending them forward either on horseback or in carts, or where there are numerous roads, on bicycles or tricycles, is one of the greatest importance. The so-called cavalry of the American Civil War were all of this character.

"The essential condition of the efficiency of mounted infantry is, that while they can ride well enough to get over such ground as is required * * * they look altogether to fighting with firearms and on foot whenever collision becomes necessary." * * * It is only the experience of War on a large scale which brings home to cavalry officers the disastrous consequences of injuring their own power by continually trying to take up the rôle of mounted infantry. * * * By no process can cavalry compete with infantry if they measure themselves with them under conditions favorable to infantry fighting."

Now, it is to supply the want which these writers so ably demonstrate that the present mounted infantry regiment has been called into existence. I cannot possibly hope to depict the relative value of this mobile infantry in more concise or eloquent terms than those employed by the talented writers, quoted above.

If the Germans have not so far organized any system of mobile infantry, it is, evidently, not from the want not being felt, let us rather suppose that it is the absence of the means for supplying this want, which is the reason of the non-existence of such a force.

The adaptability of the Briton, and of the British soldier in particular, to every circumstance of life, is a quality which we ought to cherish most deeply, and it is an attribute to which we seem to attach little importance. What troops but British troops could have forced their way from Thunder Bay to Fort Garry, in 1870; from Cape Coast Castle to Coomassie, in 1874; from Cairo to Metemmeh, in 1884–85. British troops, and infantry in particular, have shown themselves equally at home in portaging boats up un-

known rapids; in forcing their way through trackless, impenetrable, and fever-stricken tropical forests; up dreaded cataracts, in boats, upon the most difficult river in the world; or, on camels, across pathless and waterless deserts. Surely, for such men, the management of a horse is not too hard a task! Our infantry, in this particular characteristic, stand unrivaled in Europe, and England may safely rely upon them to carry out the rôle which it is now proposed to assign to them.

I submit for your consideration what a magnificent opening was afforded to an enterprising cavalry leader, at the head of a combined force of cavalry and mounted infantry, in 1870, had the French possessed the power which, I venture to think, is existent in our Army. What might not a force, so composed, have done against the 400 miles of exposed line of communication between Paris and the Rhine. Organized in the valleys and intracacies of the Côte d'Or, a dashing leader could have reached the Paris-Chalons-Metz line in three days, could have struck his blow, brought confusion and consternation into the German camps before Paris, and have retreated and struck elsewhere before any concerted counter-attack could have been made.

We Englishmen are, gentlemen, too apt to undervalue ourselves at the expense of our neighbors. We do not, I firmly believe, rate the value of our soldiers sufficiently high!

The quality of our officers, the physique and the adaptability of our rank and file are, I believe, unrivaled in Europe!

It is the fashion to decry the qualities of the British troops of to-day. I claim to be also *laudator temporis acti;* but, as Colonel Onslow has recently shown you, the physique of the modern British soldier has unquestionably improved, so also, in a still higher degree, has his moral and intellectual worth! I believe that at no previous period of our history has the Army been composed of such worthy representatives of the nation as at present!

It remains for us to utilize the qualities inherent in all Britons, and we shall find, if we only put it to the test, that this country can furnish as numerous and as efficient a body of improvised mounted troops, organized and drilled as mounted infantry, with equal, if not greater facility, than did the Americans in 1862–64. We alone, of European nations, are capable of doing this, and an attempt by Germans or French to form a mounted infantry force has, perhaps wisely, never been undertaken. Here, then, we can take a lead in Europe; here we have the power of initiative in a phase of modern tactics in War, which may bid fair to bring a complete and rapid success to our arms in any conflict with a foreign power less happily constituted.

A well-known and able military writer, Colonel Chesney, in a lecture given at the United Service Institute, on March 24th, 1874, took his audience and the public by surprise in advancing the theory that—"30,000 horsemen would, if handled boldly, without fear of consequence or regard to conventional rule, utterly cripple and confound an opposing army of 300,000! Riding to and fro in rear of an army, intercepting its communications, cutting off its supplies, destroying its reserve ammunition and

material, such a force would, undoubtedly, create panic and confusion far and wide."

Colonel Chesney's views are based upon the marvellous results attained by the American cavalry leaders, such as Morgan, Forrest, Grierson, Stuart, Sheridan, and others. It is certain that our cavalry alone would be unable to effect such a rôle as this, but if supplemented by a large body of horse artillery, mounted infantry and machine-guns, a mounted force will, in the future, it may be assumed, have a power of independent action which no European nation has hitherto been in a position to attempt.

III.

THE RÔLE OF MOUNTED INFANTRY IN COLONIAL AND SAVAGE WARFARE.

From the very varied character of the countries and climates in which British troops are called upon to serve, it follows, as a consequence, that there must be a great number of occasions when infantry will be thrown upon its own resources, and separated from, or not associated with, cavalry, and when it has to take its own measures for compensating for this deficiency. It is under such circumstances that mounted infantry may be utilized as scouts, or on reconnoitering duty, and when they may, in fact, be made a substitute for cavalry, performing in a rough and ready fashion those duties which a highly trained and expensively equipped cavalry would, doubtless, perform to far better advantage were they available. Under certain physical conditions of ground mounted infantry may even be usefully employed on outpost duty, co-operating with cavalry, but the occasion must be one of an exceptional kind which would warrant a reconnaissance being carried out by mounted infantry alone.

No commander of a cavalry force would risk his mounted infantry by employing them in face of a European cavalry when the ground was favorable to the action of that arm. The cavalry commander must be left free to discern the occasions upon which mounted infantry may be used to assist cavalry in outpost duties.

It must, obviously, conduce to the increased efficiency of every infantry battalion serving abroad, that it should have in its ranks a certain small percentage of officers and non-commissioned officers and men who are capable of performing such duties, and it should be borne in mind that no military expedition, however insignificant in size, can be undertaken without having a proportion of mounted men capable of acting as scouts and vedettes, and our cavalry, from its insufficiency of numbers, cannot be always reckoned upon to supply this want.

IV.

PRINCIPLES WHICH MUST GOVERN THE ORGANIZATION OF A LARGE FORCE OF MOUNTED INFANTRY IN MODERN WARFARE.

The great principle upon which any sound system of organization in the British Army must be based is the regimental system. In no army in the world does there exist the same "*esprit de Regiment*" as that which is the motive power, the very life indeed, of the British Army. No warrant, no system of short service, no amalgamation of regiments, is able to destroy

the *esprit de corps*, which is the pride of every regiment, cavalry or infantry, and the question, therefore, arises, how best to utilize this for the purpose before us.

There are three ways in which a force of mounted infantry may be created.

1.—By taking one or more infantry battalions entire, and mounting them.

This plan would entail such wholesale drafting and redrafting of unsuitable officers and men that it would be tantamount to raising a new corps. Speaking generally, there are only a small proportion of officers, non-commissioned officers and men in an ordinary fnfantry battalion, who are capable, or who would be willing to be turned, bodily, into mounted men. Again, it would amount to reducing the infantry branch of the Army by one or more cadre.

2.—By taking a company complete, viz., 5 officers and 128 non-commissioned officers and men from certain selected regiments, combining the companies so obtained, and making them into a regiment.

This plan would practically amount to emasculating the battalions from which the companies were drawn. No infantry battalion could stand the drain of 5 of its best officers, and 128 of its best non-commissioned officers and men at the very time when all its best men were most needed, viz., at a mobilization, when a national emergency was imminent.

3.—By obtaining a small detachment, viz., one-fourth of a company, from a large number of infantry battalions, and then making these units into companies, and the companies into regiments. Each detachment, viz., one-fourth of a company, consists of 1 officer, and 32 non-commissioned officers and men, and is a complete unit in itself, which remains intact in the mounted infantry company and regiment, and is always representative of the regiment from which it comes, bearing its name, and which, while maintaining its own traditions and *esprit de corps*, would, after the occasion for its services in the mounted infantry regiment had past, return to duty with its own battalion, bearing with it all the credit and good name which it might have gained while serving in a *Corps d' Elite*.

The drawback to the latter system is obvious, and the task of welding into an harmonious whole so varied a number of units is no small one; there are, however, advantages in it which do not at first sight appear.

(*a*) Infantry battalions can easily spare so small a detachment.

(*b*) Service of this special kind is very popular with officers and men on account of the opportunity afforded for individual distinction, and, consequently, the best men come forward to volunteer.

(*c*) The wholesome emulation between the regimental representatives is a sure means of obtaining and maintaining a very high standard of efficiency.

This latter (3) is the plan which has been carried out in the organization of the mounted infantry regiment, which has recently been trained here, at Aldershot. So far as it is possible to judge, the system has answered well in every respect, and it may be unhesitatingly affirmed that by no other system could the same satisfactory standard of efficiency have

been obtained in a two months' course of training. The good, indeed exemplary, conduct of the men has been especially remarkable.

There are certain objections which are obvious enough, but can any one propose a better scheme?

I hope that I may be excused if I venture to express the view—and in this I am backed by many far abler critics than I can pretend to be—that if a permanent force of mounted infantry was organized, such a corps would lose its characteristics as infantry in a very short time, in fact, its time would be necessarily devoted to training and care of horses, rather than to gaining the complete and perfect knowledge of shooting and of other infantry soldier's duties, for the proper and efficient performance of which, in War, mounted infantry are alone required.

To have such a permanent corps would, in my humble judgment, be a costly and unnecessary addition to the budget, and would, moreover, be of very doubtful advantage to the cause in question, and would, after all, be limited in numbers, and be incapable of expansion.

V.

SYSTEM OF DRILL, DISCIPLINE, AVD INTERIOR ECONOMY.

The necessary drill, discipline, and interior economy is now very clearly laid down in the regulations for mounted infantry.

The only drill, which is of a special kind, is of the very simplest character, and can be learnt in a few minutes, the whole principle being that few movements are necessary to enable mounted infantry to execute, when mounted, their ordinary infantry drill, as laid down in the field exercise of 1889. Experience has shown that for manœuvering considerable bodies of mounted infantry, whether provided with Cape horses, Cossack horses, Arab horses, Burmese ponies, or English cavalry troopers, all formations must be in single rank, and that each company, composed as it is of four distinct divisions, will move most readily in company quarter-column, or quarter-column of divisions. Experience further shows that men mounted upon untrained or only partially broken horses, move with the greatest facility in half-sections, worked upon the same principle as the formations which were adopted by the Boers, in 1881.

The fundamental principle, however, which underlies the whole of the drill and interior economy of mounted infantry is that each division (a representative and distinct unit in itself) is broken up into permanent sections of four men, viz., a section leader, who may, or may not, be a non-commissioned officer, and three men. These, with their horses, remain always together; their horses are together in stables or on the horse lines; the men themselves sleep side by side in the barrack-room, and lie side by side at the bivouac; the section is named after the section leader, and the comrades perform for one another duties and offices, to do which, under other circumstances, men have to be detailed by an orderly serjeant. The comradeship thus originated is of priceless value. The system of the barrack-room and the bivouac is made identical with that of the drill-ground and the field of battle; confusion becomes impossible, and a real system of fire discipline is insured.

It has been argued that the system of permanent sections, good as it is in theory, cannot be maintained in practice during Peace; to this it may be replied that this system has been insisted upon wherever mounted infantry have taken the field or have been organized, and that it has been tried in an infantry regiment in Peace time with a most beneficial and satisfactory result. Upon ordinary parades, it is certainly impossible to maintain such a system in its entirety, but at squadron or company training, at musketry, and on general parades it can be, and it should be always insisted upon, whenever, in fact, instruction is to partake of a practical character, and as representing actual service conditions, the barrack-room (the administrative) system should be identical with the field (the tactical) system.

This is, I venture to think, gentlemen, the key-note of drill, discipline, and interior economy in any aegiment or corps, without which no real efficiency in War can be maintained, and this is the *key-note*, the *foundation stone* of the mounted infantry organization. This system can be equally adapted to an infantry battalion or to a cavalry regiment. Each company is divided permanently into four squads, which squads, when on parade, represent the four sections of the company. Each squad is, in its turn, subdivided into permanent sections, or groups of four men, the section leader and No. 3 of the section in the front rank, Nos. 2 and 4 in the rear rank.

It is the business of the serjeants of squads to make up the sections which are deficient in one or more of its men by other broken sections for the day. The section made up retains the name of its section leader, and maintains its relative position in the squad. In telling off, numbering is not required; each man knows his place, knows his comrades, and has the confidence in the man on his right and left which such acquaintance gives. This is the system, which, when understood by the men, saves them all the harassing fatigues and annoyances caused by being continually warned for petty fatigue, which is so irritating when hardly-worked, and conducive to minor acts of insubordination, and of resentment to the proper authority of non-commissioned officers.

It is too late to improvise such a system when once a campaign has been entered upon. An example of this we may some of us recollect in the Zulu War of 1879, when the orders to form permanent sections became a dead letter for the good reason that no one understood what was meant.

In order to satisfy admirers of all things German, it may be remarked that a system of "Gruppen" exists in the German Army, and in the Peninsular War the principle was invariably recognized, viz: that men who knew one another should be always together under the same non-commissioned officer or chosen man. If, therefore, the object of drill is to train and prepare both officers and men for war, as stated in the first paragraph of the new German Field Exercise, I submit that this organization is a sound and a very important one, and which is well worthy of your consideration.

VI.

THE NUMERICAL INSUFFICIENCY OF BRITISH CAVALRY IN PROPORTION TO THE OTHER ARMS CONSIDERED.

The disproportions of our regular cavalry to the other arms is well

known, and it is, moreover, a fact that our cavalry has benefited only in a modified degree from the present system of reserves.

These are the recent figures: In the regular army (1st April, 1888) the total actually serving, including India, was 211,492. The first class and second class army reserve was 55,200; making a total of 266,692. Of this number there are only 18,828 cavalry, and 3094 cavalry reserve, which gives 8.9 per cent. of cavalry to the regular army, and 8.2 to the regular army including reserve. The minimum proportion in all continental armies of mounted men, *i.e.*, cavalry to infantry, is 10 per cent. In the Napoleonic wars it was 15 to 20. We have, therefore, a deficit of 2007 men for our regular army. In the case of mobilization and the whole reserve being called out, we should have a deficit of 4169 men to make up. We have not one single man, except the numbers I have given you, who are trained as cavalry soldiers. * * *

VII.

SADDLERY AND EQUIPMENT OF MOUNTED INFANTRY.

At the risk of detaining you rather longer, I wish to allude to the question of equipment for mounted infantry.

The present saddle equipment and kit, as laid down for the mounted infantry soldier, based upon the scale for the cavalry, weighs 149 lbs. 2¼ ozs. Add soldier at 10½ stone—147 lbs. Total—296 lbs. 2¼ ozs., or 21 stone 2 lbs.

Now it is obvious that this amount cannot be carried by a small horse, except at the risk of his becoming non-effective after two or three days' march, and it, therefore, becomes a question of absolute necessity in my opinion—

(1). To reduce the weight to a minimum.

(2). To so distribute that weight as to cause least inconvenience to the horse.

(3). To enable all superfluous weight to be taken from the horse and carried upon a led horse, or in a cart, when a forced march is necessary.

I have, with these objects in view, proposed a saddle equipment, based upon that in use by the American cavalry.

The accompanying schedule, giving the comparative weights of the present equipment and that proposed, will speak for itself.

The principal weight is carried in detachable saddle-bags, which hang below, and in line with the centre of gravity of the horse, in place of being in front of the point of the shoulder, as is the case when our present cavalry saddle is placed upon a small horse. The rifle is carried either in the hand or loosely slung over the shoulder, or resting in a small bucket attached to the off-side.

The saddle-bags being capacious and easy to pack, it is very simple to carry the three days' rations for the man, and extra ammunition if necessary. Fatigue is saved to the soldier, and the minimum of inconvenience is caused to the horse.

As the saddle or saddle-tree comes completely down on the horse's back, the soldier's seat is on, and not raised above the horse, consequently

oscillation is prevented, and the soldier is enabled to have his bridle hand low.

The system of cynch girth obviates all buckles, can be shortened to any extent, and is absolutely firm.

The man's blanket, weighing 4¾ lbs., is carried on the horse, Transport is, therefore, economized to the extent of that amount per man. * *

WEIGHTS.	Regulation pattern for Cavalry and Mounted Infantry. lbs.	ozs.	Proposed for Mounted Infantry. lbs.	ozs.
Saddle and details	40	9	23	4½
Bridle complete, with head-rope	6	13	3	8
	47	6	26	12½
Articles on horse	16	0½	16	0½
Heel-rope and peg	2	0	2	0
Add for blanket used in place of numnah	.....	.....	2	0
Kit in wallets	19	1¾	19	1¾
Cloak, or infantry great-coat and cape	8	1¾	5	4¾
Articles behind saddle	15	13½	15	13½
Total on horse	108	7½	87	1
Infantry soldier's accoutrements, rifle, 70 rounds of ammunition, and bandolier	40	10¼	40	10¼
Soldier at 10½ stone	147	0	147	0
Grand total	296	2¼	274	11¾
	stone	lbs.	stone.	lbs.
Or	21	2	19	8
Price—saddle complete	£6 7 10		£3 7 0	
Price—bridle complete	£0 11 9		£0 10 0	
	£6 19 7		£3 17 0	

By the proposed equipment the forehand of the horse is relieved of 16 lbs. dead weight, and carries only 10 lbs. 15¾ ozs. in front of the saddle.

	lbs.	ozs.
Regulation pattern—		
Pair wallets	2	5
Kit in do. as per G. O., July, 1887	19	1¾
Infantry great-coat	5	0
Cap	0	4¾
Mallet	0	5
Total	27	0½
Proposed pattern—		
Pair wallets, shoes and 20 rounds of ammunition.	5	11
Infantry great-coat	5	0
Cap	0	4¾
Total	10	15¾

VIII.

RELATIVE VALUE OF MOUNTED INFANTRY TO THE AUXILIARY FORCES OF GREAT BRITAIN.

On the 1st April, 1888, there were militia infantry, and engineers 141,593; of volunteers, 257,834; nearly all efficients, making a total of 344,110 infantry. Of mounted men in the current year there are—Yeomanry cavalry, 9749, and of Volunteer Light Horse, 296, making a total of 10,045 mounted men. Statisticr are dry, I know, but it amounts to this: the proper proportion of mounted mem to the infantry stated is 34,911, yet, as a matter of fact, we have only 10,000 available, leaving a deficiency of 25,000 men, for which we have absolutely no provision whatever. This disproportion struck me most forcibly in 1887, when I was sent to witness the Swiss manœuvres. Now Switzerland looks, upon the map of Europe, small and insignificant, yet the Swiss have 100,000 men in what they call their first line, and 88,000 in the second line. These troops are not as our auxiliary forces are, so many disconnected atoms; they are a consistent whole—an organized army—with the proper proportion of infantry, cavalry and those departments, both of transport and supply, without which an army is only an armed mass. It is a well recognized fact to all military minds that our great Volunteer Army in this country is absolutely useless for a campaign, and for any practical military purpose as it stands now. There is only the miserable proportion I have read out to you of mounted troops, and there is also a very small proportion of artillery! Surely, this is a sufficiently serious fact, and one which should attract strong public feeling.

* * * * * *

Roughly speaking, the principle which I venture to suggest for your consideration would give a force of approximately 7128 mounted infantry soldiers, *i.e.* 33 officers and non-commissioned officers and men from 216 volunteer infantry battalions. Now, it is obvious that in many instances this number might be easily doubled, or even quadrupled, so that having once conceded the principle of organization proposed, it ought not to be difficult to raise from 15,000 to 20,000 men who would be available for mounted service in the same manner as the American cavalry were organized in 1862–64. In order, however, to carry out this theory, it is absolutely essential that there should be a mounted infantry school of instruction where officers and non-commissioned officers of the auxiliary forces could be trained, and where efficient instructors could be supplied.

IX.

CONCLUSION.

* * * * * *

This question of mobile infantry is one of the greatest importance, as I cannot but feel that it bears strongly upon the general efficiency of the British Army as a fighting machine.

Gentlemen, we are warned on all sides by the leading statesmen of this country, and by the political condition of our Continental neighbors, that a great crisis in the world's history is at hand, that, as was said by a well

known and prominent military leader not long since, "a war cloud is hanging over Europe, greater than any which has hung over Europe before." This crisis cannot be long deferred, and may, indeed, be upon us at a moment's notice, and we may then find ourselves, as soldiers, the champions of the unity, nay, of the very existence, of this great empire, an inheritance which has been built up piece by piece by the successive efforts of our predecessors in arms, and which now stands as the vastest, the richest, the most intellectual, the most advanced in civilization of any empire which has ever existed in the world's history.

What greater incentive is required to work consistently and persistently for the improvement of the tools with which we, as officers of the British Army, must some day have to act our part, than the maintenance of such a birthright.

Let us all, in our several lines, work diligently and perseveringly to this one great end, viz., the increased efficiency of the Army to which we belong; and if I have succeeded, in the course of my lecture, in opening up an additional means to the glorious end which we have all of us so near at heart, I shall indeed feel that I have not unjustifiably engrossed your attention.

May we each and all of us, when the moment of trial arrives, when we, as officers, are called upon to reap what we have sown, be able to say, with Charles Gordon, in the concluding sentence of his diary at Khartoum:

> "*Thank God I have done the best I could*
> "*For the honor of my country.*"

DISCUSSION.*

The CHAIRMAN: In this discussion I hope the cavalry will lead the way.

Major-General Sir D. C. DRURY-LOWE said: Cavalrymen have been asked to lead the way in the discussion. I have listened attentively to the lecture, and as a cavalryman I cannot see that there is anything I can discuss in a combative spirit. We have heard a great deal about mounted infantry, but to my mind the lecturer has disposed of one great argument against it by avoiding any advocacy of their interfering with cavalry. I feel convinced that the use of horses or ponies by infantry as a means of locomotion to enable them to keep up with cavalry will be an enormous advantage to the cavalry force. I will not admit that mounted infantry can take the work of cavalry, but in many cases they will be an enormous help to cavalry. They might save them from a great deal of hard work in a standing camp, on patrol on roads, and such like. * * *

Major-General PHILIP SMITH, C.B., said: In considering the use of mounted infantry we must remember that it is the long marches which kill infantry soldiers, and if we can carry them to the point of battle it will be an excellent thing. And on this point I would ask whether it would not be well to have wagons attached to mounted infantry companies, in addition. As regards the mode of organizing this force, I think it an excellent plan, in the first instance, to have a certain number of men from each regi-

*For want of space, a portion only of the "Discussion" is reprinted.—[EDS.]

ment, but when the force is more strongly established, I think a regiment of itself, or perhaps two, would be preferable. * * *

Colonel WOOD, Inspector of Auxiliary Cavalry, said they must all agree that they had never had an abler lecture than that to which they had just listened. Major Hutton had explained to cavalry officers the exact position of mounted infantry in relation to cavalry. At the same time were they quite sure the force was attached to the proper arm of the Service? What was really the strength they proposed to add to the Army? They proposed to add 1150 mounted infantry to the Army, and they spoke of mounted infantry influencing a campaign. If they were of any use at all, why not make the force four or five times the strength? And as to the attaching of the force, why did the authorities contemplate attaching it to a cavalry division? No one knew how they would be mounted when required. The English Army had to fight in very out-of-the-way places. Conveyance by road in cars would answer best in some instances; in the desert the camel would be used; in Afghanistan and Northern India the pony. So they might assume that the transport of the country would be that used by the mounted infantry force, and, therefore, for the present at any rate, he thought they should be attached to the arm of the service which provided the transport. Furthermore, it would be better for general officers commanding the Army to be able to detail them where required, instead of their being always a part of the cavalry brigade or division. There were times when mounted infantry might be of great importance. It might be possible to gain an advanced position and hold it, but at the same time there might be a great risk by pushing forward men indifferently mounted. One object of cavalry was to get as much information as possible, and make the enemy show his forces, and if they were successful they very soon found it out. It might happen that cavalry would meet an opposing force and be driven back with casualties. The cavalry would fall back rapidly, and they must either leave any mounted infantry that were with them or sacrifice themselves. The occasions when mounted infantry would be of use with cavalry would be rare, and could only be specified by the general commanding. As regards the saddle (Whitman) which Major Hutton had introduced, this is the ordinary American cavalry saddle, and he had the pleasure of experimenting with it at Shorncliffe, and he found it answered every requirement. * * *

Colonel LONSDALE HALE, said, as to the opinion of Prince Kraft, he thought it was generally admitted that Prince Kraft was not strong on the subject of cavalry, and that his views did not have as much weight as on the other two arms. Referring to the quotation from the article "War" Colonel Hale said that—Of all great modern wars the War of 1870 was the greatest, and the experience of that was that the Germans did not think of mounted infantry, but were now developing their dismounted cavalry to the highest possible pitch. There was not the slightest allusion in the lecture to dismounted cavalry duty, which, he argued, was an important omission. Major Hutton said the *rôle* of mounted infantry was mainly offensive, and contended that "when an enemy had occupied villages, buildings, coppices, defiles, or bridges, which could not be turned, when nothing

could be effected by the mounted action of cavalry, mounted infantry may be usefully employed." That ought to make cavalry officers jump to their feet at once, to hear that when they could not do their work mounted, they were to call in mounted infantry! Probably this was a little slip on the lecturer's part. He ought to have said that when cavalry either mounted or dismounted could not do their work, then call in the mounted infantry.

Lieut.-General Sir EVELYN WOOD: There are one or two points in which I think some of you have a little mistaken the lecturer's meaning. Colonel Wood spoke rather slightingly of the numerical strength of the force of mounted infantry. Those 1100 men are intended for one army corps only. This is a question that has been much talked about; we have heard about it in every cavalry mess, not only here but all over England, and I certainly think some cavalry officers have been carried away a little with the spirit that we were going to take away some of their work from them. With regard to Colonel Lonsdale Hale's remarks, I may say I do not believe in cavalry dismounting too often to fight. We only want him to get off his horse when he is no longer able to keep on it. Neither do I believe that cavalrymen or horses are too valuable to risk in combat. When there is work to be done it ought to be done by any one available, and no force ought to be considered too valuable to do it; but when there are infantry to do certain work we should never encourage cavalry to do it. My experience has been, that cavalry are not so useful for dismounted work, and not so well practised with the rifle as infantry, however excellent we all admit they are as cavalry. * * *

Captain MORRISON, 18th Hussars, Commandant School for Auxiliary Cavalry, said: Major Hutton has compared the action of the American cavalry in the American Civil War with that of the cavalry in the Franco-German War to the detriment of the latter. The fact is there was no fair comparison. To quote General Duke from "Denison's History of Cavalry" (speaking of the celebrated Morgan's Horse) the men "were all admirable riders, trained from childhood to manage the wildest horses with perfect ease," but the nature of the ground on which they fought being unsuitable to the action of cavalry proper, and their horses wanting in training for the ranks, they fought almost entirely dismounted; but, were, from life-long practice and habit, accustomed to use the rifle, and were, therefore, good riders and good marksmen—in fact, the perfection of mounted infantry. If their action as dismounted cavalry is to be initiated in the future as one great rôle of cavalry, our own is perfectly able, with more practice, perhaps, at the dismounted drill, to produce as good effects as is possible to obtain, where men are not habitually rifle shots. * * *

Major J. R. MECHAM, District Inspector of Musketry, said: With reference to remarks made concerning the fire action of cavalry, if reference is made to the last annual report on the musketry training of the Army, it will be observed that cavalry practice has very much improved. Cavalry and infantry fire over the same course of range and field practices, but the carbine is not sighted to the same extent as the rifle, and its recoil is greater or more difficult to control; nevertheless, two cavalry regiments in this division last year scored a better result, both in field and range practices, than

did five infantry regiments. With the introduction of the coming magazine carbine, which is sighted up to 1800 yards, and has no recoil, I believe cavalry fire action from positions where cover can be obtained for horses will be quite equal to infantry fire.

The CHAIRMAN: I wish Major Hutton had amplified his lecture, and had touched on the use and abuse of mounted infantry, as well as on its future. It is a matter for regret that there is no ground in England where our cavalry can be exercised properly, so that infantry officers can see what is its proper action in connection with infantry. We, therefore, approach the subject with great difficulty, Most of our experience has been drawn from wars with natives and not with Europeans, and we are inclined to desire greater mobility for our infantry, because we are in the habit of fighting an exceedingly mobile foe, who does not stand like Europeans when we get up to them. A great many views expressed to-day have sprung, I think, from the general desire to have a much more mobile infantry than we have got. Having first decided whether, in any particular campaign, mounted infantry mounted in wagons or on horseback, or other means are necessary (which is the first point to be considered), the question arises, who is to command them? I should take exception to mounted infantry being attached to cavalry, and I agree with Colonel Wood, though not to the extent that they should be attached to the transport. I think they would become "hewers of wood and drawers of water" to the cavalry, and would degenerate into indifferent cavalry. I think the cavalry advance on Cairo, in 1882, is a good instance of what we should expect mounted infantry to do—the seizing of a depot at a distance to obtain engines to ensure locomotion and better mobility for the rest of the Army. They ought to be under independent command, subject to the commander of the army operating, and if so organized, I think their strategical value must be immense. I cannot quite agree with General Philip Smith, that they should form in peace time a separate regiment with horses. The money would be better spent on more horses for the cavalry. I have personal recollection of two instances of the uselessness of mounted infantry as compared with cavalry for pursuit of an enemy, but I differ with Captain Morrison on the question of men not learning to ride quickly. I think they can be thoroughly taught to ride in a very short time, and if they are good infantry to begin with, they will be most valuable.

FRENCH FIELD ARTILLERY.

Translated from the *Revue des Deux Mondes*, by Captain F. A. MAHAN, Corps of Engineers.

THE Lebel musket is much talked of now-a-days, and there appears to be no doubt that the adoption of the smokeless powder, which is the most strking characteristic of this arm, is an infinitely greater advantage for artillery than for infantry.

"*Instructions pour le combat*," which is about displacing the famous "*Fascicules*," has attracted the attention of the public. It is a question whether anything has been heard of the new methods of regulating firing in the field, on which experiments have been made this year at the firing schools, and the possession of which assures to our army a considerable preponderance of power. People do not know that artillery tactics has undergone, in the course of the last few months, long desired improvements, that the matériel has been improved (if not the piece, at least its powder and projectile), that the constitution of the corps has undergone changes, the importance of which cannot be doubted.

The principal improvements have been in the powder, the projectile, and finally, in the rolling stock. The ammunition chests have been greatly changed. In the beginning they were, unfortunately, arranged to carry only three men. This number is not enough to serve the piece. The six pieces must necessarily be followed by caissons on which the remaining cannoniers are mounted. It was a bother. A hunter without a game bag has his movements free and untrammelled. He can move more readily if he carry no powder-horn or shot pouch, and if he be followed by a keeper to carry his gun. But he will be in a state of dependence admissible only in parade hunts. No one would think of hunting large game in such a way; the slightest imprudence would be a serious danger. It would not be less perilous for the pieces to be separated from the caissons which bring up a certain part of their cannoniers; they would be as incapable of acting as a sailing vessel without a crew, or a steamer without an engineer. Therefore, it was decided to put five men, instead of three, on the limber and, thanks to this arrangement, although each piece is nearly 330 pounds heavier, the battery is lighter and handier, and the six pieces may form an independent column. Called on suddenly to come into line, they will come up with, perhaps, a few seconds or even minutes delay, but they will not be obliged to await the arrival of the caissons before they can act.

The cannonier does not keep his knapsack on his back like the infantry man. Obliged to work at the wheels of the piece to replace it after the recoil of the discharge, he must not be constrained at the shoulder joints. Therefore, the knapsacks are placed on the chests. In the primitive model these open like a trunk, by raising the lid; everything on top had

first to be taken off. Hence delays. On the other hand, the sacks being laid on the ground ran the risk of being torn, or forgotten in the hurry of a hasty departure, or, at least, of being trampled by the horses or crushed by the carriages. Now, chests with drawers have been adopted, opening like bureaus. Furthermore, the cartridges have become so long and the projectiles so heavy, that it would be very hard and fatiguing to have to lift them.

The present shells are excellent. It was wished that they should serve two ends: destructive and death-dealing, so that they might be used against the *personnel* as well as the *matériel*. To kill men, wound, injure or demoralize them, we seek to produce a hail of small splinters. To sink into and tear up a parapet, to damage metallic carriages, to break the spokes and felloes of wheels, we need quite larger pieces of cast-iron, hurled with force and possessing a respectable power of penetration. The two conditions are contradictory.

Is it not infinitely better to hurl at a battery a great shower of dangerous fragments, than to break a few parts of carriages? Damaged parts are repaired, and that is all it amounts to. To be sure repairing damages is not always easy. Still it is possible. Steel and iron are not unwilling. Man is less malleable. This "thinking reed," can be reached by fear; he lets himself become demoralized. If the shell hits an ammunition chest and blows it up, thirty rounds are lost; but at a distance of three kilometres the chances are largely against such an accident happening; it requires an accuracy on which we cannot reasonably count. Let a shell of grape, as the new projectile is called, burst at a good height, it crumbles into more than two hundred pieces, which fall like hail over an area several hundred metres in depth. It is then of small importance to have the aim true. The space covered is so great that it is a miracle if at least half a dozen men are not put out of action. This is much better than to break a sight, wound a horse, or cut a trace. Sure of doing great harm to the personnel, fire is no longer directed at the teams, and other elements of batteries. Against walls, too, these shells of grape are sufficiently effective, acting by their mass and not by bursting. In a word, we are better armed now than in the past, to reach cavalry and infantry, and if, to ruin the enemy's artillery, the conditions are not quite as great as formerly, it may not be said that they are less good. Furthermore, if it had been found necessary to preserve the heavily loaded shell along with the new model, nothing would have been easier, but the great benefit of simplicity would have been lost. It is well to get a start toward unity of ammunition, which will finally be realized when canister, which is only good against cavalry charges, when it is of any good at all, shall have disappeared from the ammunition boxes. As a rule, there is no use of it. After the War of 1870, the German artillery returned to the arsenals every round of canister which had been taken from them, save one—which had been broken on the road. These obsolete affairs take the place which might be used for shells; it is a dead weight piled on the wagons. Forget the glorious part played by grape, forget that the Drouots and the Sénarmonts used it victoriously to sweep the battle-fields of the empire; give up practising this pious gratitude which keeps in service troops and customs, which have no longer a

reason for their existence, simply because they had a share in our successes of former times. We have been able to do without musketeers, carbineers, *voltigeurs*, grenadiers and guides. The lance, called by Montecuculi the queen of arms, has disappeared; the bayonet, too, seems to have served its time; the round shot of Vauban and Gribeauval, this ball whose ricochet was so terrible, has been finally erased from the list of our death-dealing tools. The spherical shot is as much out of date as the bowman's arrow; the cuirass will, before long, join in the museum the shakos of the olden time. Everything is renewed. Let us be able to break at the proper time with superannuated traditions, pitch our canister out on the scrap heap and substitute the shell of grape, which will increase the effective strength of our batteries and realize the long-sought unity of ammunition.

The use of smokeless powder for cartridges cannot be placed in the same rank as the unpretentious changes to which the public attaches small importance and to which it pays little attention. Here is a question of something else than an improvement in matériel: this substitution of a crafty chemical agent for a noisy explosive involves more than a diminution of the recoil. And, still, what the inventors of this remarkable product seem to have had alone in view was the diminution of interior pressures produced in the chamber by the gases arising from the explosion, and, consequently, a diminution of the chances of bursting the gun or blowing out the breech, and also greater security for the gunners and less wear and tear on the piece and its carriage. It is found that an accessory property of the new powder is about to play the most important part. The suppression of smoke marks a new era in tactics. It will, so it seems, greatly change the course of actions. In what way? The question is not easily answered, and hence it is open for discussion. There is a terrible unknown quantity at the bottom of this problem in military psychology; but it cannot be denied that the invisibility of a shot changes the conditions of the struggle, as the movableness of type has changed those of printing or as the idea of condensers has transformed the steam engine.

II.

We have the tool. It remains now to use it. This is a matter of manœuvres and organization. A place must be given to batteries in column, such that they may come quickly into line; of not less importance is a prompt and sure transmission of orders. The occupation of a position must be accomplished simply, without the slightest hesitation on any one's part, that is to say, by means of a mechanism of well-regulated movements. Finally, the firing must be effective, the shells must reach their mark.

To be sure we have sights which can be set for the distance that the shell is to go. But only a certain approximation can be had in this way. First, we never know our distance exactly, and then, were it accurately known, the corresponding sight would only do after several corrections. The greater or less strength of the wind, whether it comes from the front or the rear, the height of the piece above or below the mark, the slope of the ground to the right or to the left, the greater or less density of the air, the more or less action of gravity thereon, that is to say, whether the alti-

tude of the battery is great or not, all these cause variations in the normal trajectory, and, therefore, corrections in the normal sight. More than this: two successive shots, fired under the same apparent condition, with the same sight, that is the same elevation, aimed exactly alike, do not necessarily reach the same point; invisible, but not imponderable, causes influence fire. The two shells did not weigh the same, when made, within a few grains. Since then they have been painted and repainted. The coat of paint is thicker on one than on the other; it may have scaled off at some points. The denuded parts may have become rusty, and a little of the oxydized metal may have been worn off in carrying. The powder in one cartridge may be less than in another; if it has deteriorated, if the grains are broken, if it has become damp, it is weakened. In a word, many small causes may be superposed to produce marked results. However careful we may be, how calm soever the air, in spite of the most perfect aiming and identity of outside surroundings, it will be a miracle if the second shell pass through the hole made in a target by the first. In action, still more than on the drill-ground, we must expect to see great variations.

From this it follows that, on the one hand, a perfectly exact knowledge of the distance is not sufficient to give the right elevation, and that, on the other, this elevation being found, we must not expect to see the shells burst in the same place at every shot.

It is much less easy than one would suppose to estimate the distance to a far off point. Even a map is not enough. The eye, though aided by a glass, is the puppet of deceptive illusions. Prince Hohenlohe, whose writings are an inexhaustible supply of exact and valuable observations, mentions many cases of errors of this sort:

"However much experience one may have acquired in determining distances, more or less light or even temperature tends to set one astray. As a rule when the enemy is firing at you, you think him to be nearer than he really is.

"It happened to me, to me first of all—I think I must confess—to be caught in this way.

"It was at Sadowa. After crossing the Trotinka, I was placing my batteries in their first position. I was at the head, accompanied by the major and by the commandants of batteries. Having reached the plateau where I was to establish myself, we were all unanimous in our opinion that we were not more than 2500 paces from the Austrian artillery, which was on the height of Horenowes, and from this point, since become historic, its fire had been opened. We began ours with the sights set at 2500 paces, The first shell showed that our estimate was much too small. The fourth shot, which scarcely reached the enemy, was fired with the sight set for 4000 paces!

"Errors in the opposite direction are also made. During a reconnaissance in the neighborhood of Nübel, on the morning of January 10, 1864, there was a slight engagement, in the course of which we remained quite a while near a house. We were ten or twelve horsemen. Bullets were flattened against the wall over our heads. They came from a patrol of three men on the flank of a marching column, and were fired from a grove of

trees. We were all astonished at the great range of the Danish rifles, because, after much consultation we agreed that the house was 800 paces from the grove. When the enemy had been dislodged from his shelter we measured the distance. It was found to be 250 paces! The enemy must have made the same mistake as we, since all his balls had gone too high.

"In the field, the ground plays some really comical tricks on the commanders of batteries. Let there be, without the battery seeing it, a slight depression in the ground in front of the mark; if the shell bursts therein the smoke rises as it clears away, leaving the mark to be seen through it, with so great distinctness as to leave one to suppose it to be on the hither side of the smoke, and consequently, that the range is too long. I have been present at an artillery school, where one of the most experienced of the instructors had set his sight 500 paces short, and he continued, thinking it to be just right. In a battle I was alongside of a long artillery line. For several hours the range was too short. It was only at the end that I noticed it and gave warning."

Another distinguished artillerist of this period, General de Dresky, admits having made equally great mistakes of observation, although he had the assistance of a spy-glass. In the battle of August 18, 1870, he opened fire on four of our batteries, established in front of Montigny-la-Grange, which seemed to him placed behind embrasures made in a garden wall. "The flash of the discharges only was seen; there was no doubt that these came from the loop-holes; it was at them that we aimed. Two days after, on visiting the spot, we noticed that the batteries were in front of and not behind the wall; this was known by the presence of the dead bodies of cannoniers and horses and the heaps of debris. At the same time we saw that there was not the slightest opening in the wall; it was merely some branches overhanging the top that we had taken for embrasures. And we were only 2500 metres off!"

If one be threatened with such optical illusions, what must not be the difficulties of regulating the fire! One is tempted to seek a means of measuring the distance to the mark, at the same time that he is led to think that the search is impracticable. Should the point of fall, with respect to the mark, be seen, it is easy to regulate the fire by observing the shots. If the point be not clearly seen, we are lost unless we possess some telemetric instrument which gives the distance exactly. But how to use it when the object to be reached is so indistinct? All apparatus of this sort is excellent when we wish to know the distance to a mill, a steeple, a tree defined on the horizon, an edge of a house standing out in white against the dark background of a forest or meadow. The case is no longer the same, when it is a question of an enemy, who does all he can to deceive. How, at 2500 metres even with the use of a spy-glass, can we believe that the guns, with all the movements to and fro of the cannoniers and the stirring of the horses, are behind a wall instead of in front of it? Can a more stupid blunder be imagined? And does not this fact tend to prove that the perfected apparatus itself gives little security? Ah! If we are sure of the results which they give, if, for example, having measured with a stadia or telemeter how far we are from the object, the distance found (say 3000 metres) is certainly

exact within 100 metres more or less, we shall be sure, by ranging our sights from 2900 to 3000 metres, to cover all the ground occupied by the enemy. It would even be sufficient to fire at 2900, the cone of fragments scattering over a depth of 200 metres would make the position untenable. Unfortunately we cannot count on so great accuracy; it is therefore necessary to obtain from the firing the means of regulating the firing, and to use the piece as a telemeter. Did the shot fall short? The muzzle of the gun is raised with the effect of increasing the range. If now the shot goes too far an intermediate elevation is tried. In a word, by series of successive trials the target is inclosed as in a vise, of which the jaws are coming together; to use a technical expression, the fork is closed. Optical instruments, after being (about 1875) in vogue to an inconceivable degree, have become to-day undeservedly discredited. Still a change of opinion is appearing, very discreetly it is true, in their favor. After recommending commanders of batteries not to let themselves be absorbed by their spy-glasses, the regulations now counsel them to obtain, by no matter what means, as exact data as possible about the distance of the enemy, and to no longer await this information from the striking of the shot alone. As if it were easy to observe them! Let us rather ask Prince Hohenlohe what he thinks about it. "Nothing," he says "is apparently easier. The captain has only to stand, in a position sheltered from the wind, glass in hand on one wing of his battery. Let us suppose that he is at the left. Every shot that seems to burst to the right of the object will be short; if he sees the smoke to the left the shot has gone too far. (This, be it understood, supposes that the shot have been accurately aimed.) Nothing simpler, nothing easier. But, even in time of Peace, errors are made in aiming, and if one be mistaken, if we have aimed at the third piece of the enemy's battery instead of the fourth, the conclusions reached by the captain are necessarily false."

In action the observer will have to contend against still other obstacles; the smoke of the enemy's gun will conceal that of his shells. Let several batteries be firing convergently against the same point of the opposing line, not one of them can tell with certainty whether an observed shot be its own or one from a battery adjoining, and the answer to the question will often be wrong. One will think himself sure of his hit, when in reality the shot has gone astray, and he will throw away his powder and shells until he notices his mistake. Then he must begin again to set his sights.

But during this time the enemy has obtained a good range, and his fire has become heavy. Furthermore, when you wish to notice a shot, the smoke of a hostile shell coming near your field glass may cloud your view, or even tarnish the glasses. You quickly wipe them off with your glove and command "Fire!" for the next piece. At this instant a projectile whizzes by the ears of your horse, which shies, and you no longer think how your shell falls, having all you can do to keep yourself from falling. Ah! a shrapnel bursts right in the midst of a team. The latter starts and runs foul of you just as you were beginning again to observe. Shells rain faster and thicker about you. Your men become excited and take less care in setting the sight, and no longer take pains to aim just right, therefore, the indications given by the dropping of the projectiles have no more value.

Do not think that these are mere suppositions or fairy tales. After giving the preceding account of the accidents which may damage the proper regulating of the fire, Prince Hohenlohe adds: "What I tell you are things which have happened to me personally; they occurred at Sedan. I had just placed the first two batteries of the corps artillery. I had established them behind a hedge, hoping that this hedge and the trees in front of it would conceal our position from the enemy. But our first shells burst among the branches, almost at the muzzle of the pieces. It was, therefore, necessary to begin by felling the trees which bothered us. This was a matter of more than a quarter of an hour. At this time occurred the incident I have just related, and, more than that, the enemy worried us greatly. I could do nothing but cease firing all along the line, check myself the sights of all the pieces and fire by battery volleys, so that the simultaneous explosions of the six projectiles might enable me to see and judge better. This primitive way of measuring distances was proposed by Colonel Scherbening, who had just that moment been killed. It gave us excellent results. We began to get some good shots. The enemy ceased aiming calmly, and his fire lost its effect. We soon had the upper hand; but more than an hour had been spent in fruitless trials. Now, if I remember rightly, the distance was about 3200 paces, or 2400 metres. Hence we were at what is considered the most advantageous range for an artillery duel, and it is pretended to-day that at the end of a quarter of an hour this duel will bring about a decisive result!"

Let us not believe in a lightning-like action of artillery. Its coming on the scene has an immediate effect. The first roar of its guns intimidates the enemy and stiffens the courage of our troops. But the dismay or joy caused thereby is of short duration, especially if the opposing forces are not made up of raw recruits. The task accomplished must be in proportion to the racket made, and the harm done to the noise. Cannons, if on becoming accustomed to them we see that their fire is ineffective, will become a harmless fan, like scarecrows planted in a field to keep away from the crops the birds which, at first scared, but then becoming more confident, at last draw near and alight thereon. The effectiveness of the fire depends, in the first place, on the shell and on the working of the fuse and other material data heretofore mentioned, and then on the methods of sighting. *These should be simple, and expressed in terms clearly understood by the mind and easily retained by the memory.* Their application should be possible without hesitation. They should finally lead safely and quickly to the desired result, that is, the determination of the elevation suitable to the distance from the target.

The regulation methods in France are unanimously considered excellent. They are due to a technical commission, sitting at Poitiers, which directs the Practical Course, to which the *majors* and *captains* of the arm come in succession to learn the rules of firing. This year again it has caused new methods to be tried at the firing school, which are improvements on what had gone before. Its propositions have been, as a rule, very successful; still it has been noticed that it has started on a dangerous slope. When perfection has been reached it is rarely that we do not try to excel

it. We incline toward the complex, the confused. Some of the novelties which have just been tried have been criticised; they were found too ingenious for practical purposes.

Unfortunately a gap remains. The principles given for regulating group firing are insufficient. But what is the *group?* Formerly the six-gun battery was the tactical unit, *par excellence*, of the artillery. To-day the union of three batteries forms what is called a group. These eighteen guns, bringing a well-sustained and directed fire to bear on the objective point, will quickly crush it and annihilate it. Placing them in single command and having them followed by an ammunition train insure their concerted and continuous action. The group has more deadly power than three isolated batteries attacking a common object without mutual understanding, without concerted action and oneness of view. And yet it must be recognized that, placed in line on the same ground, they are so in each other's way for finding the range that only one can be used for this purpose. The smoke spread over the front prevents them from taking any part in the trial shots. Together they find the range less well than if apart; on the other hand, the range once found, they utilize it to much greater advantage. No practical rule has given the means of remedying this recognized defect of group firing, but it is possible to affirm that it will disappear with the use of new powder, since we shall now no longer have to fear the production of smoke, which, up to the present time, has been the insurmountable obstacle.

Some officers are calling for still other reforms: the adoption of a rack sight, for example, a better instruction in aiming, a more general use of the level, more frequent practice at a movable target at the firing-schools. Just this year (1888) there has been tried on the drill-grounds at Orleans and Bourges, a system devised by Captain Tariel, to realize the mobility of the targets, or rather to give the illusion thereof. All true artillerists will rejoice to have, by this means, the opportunity to fire under circumstances similar to those of the field of action. The very batteries aimed at do not always remain immovable at the same place. Pieces recoil a little at each shot, and are not returned to their original position. From this it will follow that a captain accustomed to fire at planks on the drill-ground will be thrown off his bearings if he have to do with targets which move out of place and present a changing appearance. Within certain limits the Tariel method will make happenings of this sort familiar.

Among other happy innovations there has been noticed this year at the firing-schools, less haste on the part of the batteries to begin firing. A little while ago it was a sort of steeplechase. Haste had been so raised to the height of a dogma, that in an article which caused a great sensation four or five years ago, the principle had been formulated in these terms: "We must fire, fire as soon as we can; fire first, *be it in the air, be it with blank cartridges!*" According to the trite expression haste must not be confounded with speed. Protests raised by this singular theory have made themselves heard, and a return has been had to wiser principles. We do not go so far as to recommend slowness, but we do desire coolness. In the same series of ideas evolutions at a gallop have been proscribed. If they be

allowed on the drill-ground it is for the greater delectation of the spectators and to strengthen the nerves of the actors. It is a superb spectacle to see a battery tearing along, with the thundering of pieces, the clanking of chains, the glinting of steel and copper, in the midst of the dust it raises. Then, suddenly, "Halt!" Silence reigns, a silence of death, the precursor of storms. All the carriages have stopped, the cannoniers have jumped down from their boxes, the piece is unlimbered, the trail dropped, the gun loaded and aimed. The captain has only to command "Fire!" The tempest will be let loose.

Yes, all this is very nice and very fine on the drill-ground; but things do not go just so on the field. A horseman, after a charge, is in good condition to deal a strong blow with his sabre. His excitement, far from doing him harm, greatly increases his strength, and the immediate feeling of preservation guides his arm. Heated by a swift run, the artillerist loses his coolness. Besides, though he kept it, his eyes are full of dust and are blinking; his hand is shaking with a feverish trembling. How shall he perform the delicate operations demanded by his Service? How shall he handle his sight? Shall he be able to read the fine divisions of the graduated rod? Will he think of tightening the nuts and set screws? Will he not run the risk of making a mistake in cutting the fuse, in opening it at the right point? The great merit of a cannon is its impassibility. This it is which makes them, in certain respects, superior to infantry. When we speak of immobilizing battalions for the exterior defense of forts, which, in spite of their name of forts, have become unable to defend themselves since hellofite, melinite, cresylite or the gun-cotton of the torpedo shells no longer respect anything and defy thicknesses of masonry and earth which formerly gave shelter from bombs, we do not understand why the preference is not given to those excellent machines made by Hotchkiss, Nordenfeld and Maxim. They save men. They do not turn from their true role, the offensive, foot soldiers whose place is on the field of battle, and not on the outskirts of a fortified place. A *mitrailleuse* solidly set on its carriage, with its imperturbable aim, would do the work much better. It does not recoil.

At the present time batteries are called on not to gain seconds, but almost hours. It is impossible to put all of them at the head of the column, although the danger of relegating them to the rear with the baggage has been recognized. Some of them are near the advanced guard; others are at a great distance, six or eight miles, in the rear. When an action begins they are quickly sought. They have to move by long lines of infantry, pass through villages, cross bridges more or less solidly repaired, make short cuts over fields, ascend or descend long slopes. Time presses; one messenger follows another. The noise of the action is heard from afar; the haste to join one's comrades is strong. Still the horses' powers of traction are limited; ill fed from the beginning of the campaign, spending nights without shelter, deprived of sleep, standing harnessed for whole days, they cannot go far at a quick gait. Under these conditions we can see the importance of a well-regulated march and a previous judicious urging of the horses.

These are the points which must engage the attention of the artillerists of to-day, of those whose sleep is not disturbed by the exploits of the flying batteries of the first empire, and who, far from dreaming of fiery runs and impetuous charges, only think of having well balanced teams in good condition and capable of going many miles at a trot. The efforts made in this direction by the rising generation, if they do not bear their reward on the Champ de Mars, or even at the grand manœuvres, are applied in the exercises of the camp at Chalons. There, under the orders of General La Jaille, president of the artillery commission, studies of this kind have been going on for several years, in whatever concerns horse batteries, during the course of cavalry manœuvres directed by General Galliffet. No one to-day but knows the name of Commandant Durand, who has come to the front for the very reason that he has been able to show these essential qualities of precision in movements, of continuity of gait, and, if it may be so expressed, of quickness in slowness.

At the same time that our officers are gaining their experience, the horses are giving evidence of a resistance to fatigue and a vigor which are, perhaps, unexpected. The value of our good breeds was not known, or rather certain unfortunate mistakes had cast upon them a degree of disfavor which, now, after the trials made, tend to disappear. But the mode of driving the teams remains defective. Every day there is less and less chance in France of practising the art or trade of postillion, which is just the same as that of artillery drivers. Its principles were so forgotten, or lost sight of, that Captain Littre made a sensation by formulating them. His remarkable work has restored them to honor; almost all instructors are inspired by the rational rules that he has given, ane no one doubts that they would be used to good advantage if the conditions for teaching the men riding were not so difficult.

Then, again, we are held back by a consideration of which the influence is also making itself felt in a troublesome way in the infantry. Sufficient pains is not taken to teach foot soldiers to march, because it is found useless to form a small nucleus of excellent walkers who will be lost in a mass of reservists incapable, as a rule, of making a long day's march with the knapsack on the back. And it would be paradoxical to suppose that the example or advice of the old men will have a good effect on the others and urge them forward. In like manner, what is the use of having fifteen teams well trained and well driven if mobilization raises the number to sixty? The Peace effective is one-fourth that of War. Will not the awkwardness of the drivers from the reserves paralyze all the professional skill and experience acquired by those of the active army? And, moreover, can we count on the forty-five new teams raised at the last moment? The experiment in mobilization, made by the Sixteenth Corps in 1887, was not, it appears, conclusive in this respect. We should rather think that it was not reassuring, and we are led to believe that the requisition of horses is the black stain which stands out in sombre hues against the otherwise bright picture of our situation. It is but too easy to form an idea of what will take place when we are obliged to pair and hitch together animals coming from various parts of the country, utterly unaccustomed to the kind

of service imposed, to the sort of traction in which they are used, and even to the nature of the vehicles that they have to pull.

III.

The apprehensions that we feel are experienced by others. The avowals of the Germans on this point are such as to console and quiet us. They recognize with sadness the defects of their organization and the insufficiency, in many respects, of their preparation for War. A recent work, of no great scope, and worth more for the tendencies it reflects than for its intrinsic value, contains, in characteristic passages, just the expression of regret and wishes that show the state of imperfection of the artillery. "At the time of mobilization," says the anonymous lieutenant-colonel, who is the author of this pamphlet, "our cavalry regiments had to increase their effective of horses but 6.5 per cent. In the batteries this increase was 226 per cent.! We shall not ask, however, that the two arms of the Service be put on the same footing in this respect. That would be going too far. But there is not the enormous difference between what is required of the two which exists between the figures we have mentioned. Finally, no one can find fault with us for calling the attention of our readers to the fact that the French artillery has over 10,000 more horses than ours."

"This is not the only point where the comparison is to our advantage. The effective in men, on the Peace footing, is also wholly insufficient in the batteries, and this to such an extent that the old soldiers, that is, those who have been more than one year in service, are employed, without exception, either as cooks or orderlies, writers, tailors, saddlers, boot-makers. The instruction of the gunners must be perfected, and they must be kept in practice by frequently going over what they learned in their first year. To obtain this result recourse must be had to a singular expedient: "The officers' 'strikers' are selected from among the good gunners, in order to be able to drill them at certain hours of the day in aiming, which would be impossible if they had other special duties. If the most important branch of instruction, the preparation of gunners, is in such case, we may be allowed to suppose that we are in scarcely better condition to perfect the instruction together of cannoniers of the second and third years. In fact, the cannoniers must, as a rule, rely upon what they learned during the first year, hence it is very rare for them to acquire great skill in serving the piece."

Our artillery officers come from the Polytechnic School. At Fontainebleau they go through a severe course of scientific studies. Nor is practice neglected as it was at a time when more attention was paid to producing scientists rather than manœuverers. A healthy reaction has taken place, and we have now reached a satisfactory adjustment between theoretical and professional knowledge. If there be any regret at all, it is that the qualities acquired at the School and developed in the grade of lieutenant run the risk of being lost, or greatly weakened, by the long absence of the second captains from the troops. They are detached at a critical age, about thirty, to work in arsenals, foundries, even in private industrial establishments—duties more civil than military. They are constructors,

engineers, manufacturers, bureaucrats. Applying themselves to work which is new for them and in which they desire to do their best, they let themselves be absorbed by studies far removed from their regular duties. Partly through lack of stimulus from others, partly through the lack of will, which comes with increasing years, they cease to be interested in the progress of their arm (the more so that they are not given the means of keeping posted in what goes on); they do not resist the temptations presented by their new mode of life; they find excuses for neglecting to ride; they become heavy, and later, when they return to their regiments, they find themselves behindhand, and, in a certain way, hampered by their ignorance. Six or seven years of absence, at a time when an indefatigable activity is changing everything, when institutions, regulations and theories are crowding on each others' heels, is enough to prevent one from catching the set of the current. A soldier who stops on the march to lace his gaiter or light his pipe cannot easily succeed in rejoining the column; it costs him much running and fatigue to retake his place. To bring himself up to the mark requires great force of character on the part of the captain returning to his regimental life. If many display sufficient energy and bring this hard task to a successful issue, there are still too many who grow weak and give up, as before an obstruction too high for their remaining strength.

God forbid, however, that we should suppress in any radical way duties, so to speak, outside of the arm to which our artllery officers are called. A change of air is wholesome; it is well to leave one's surroundings occasionally and not remain always in a rut. The scene is different viewed from the hall or the stage. *The horizon of men constantly confined to their barrack is too shut in and monotonous.* To be busied with an industry appertaining to the profession of arms, to learn how powder, balls, cartridges, muskets, cannons, and even the rolling stock are made, far from being hurtful, is an instructive, interesting and profitable pastime; by considering new questions the mind retains its elasticity; varied knowledge is acquired; we cease to turn in the same narrow little circle of our chosen specialty. At the same time we must not let this specialty pass out of our sight. After wandering in other fields we must return to it with still greater warmth and zest than in the past. The return to duty with troops should take place before the faculty of handling them is lost. Furthermore, officers should not be sent away for more than two or three years to posts where, from the nature of things, they forget what they should know.

The long absences imposed on our second captains are unknown in Germany. Combatants are not made to play the part of engineers: every man to his trade. But it must be borne in mind that the officers of the German artillery have not the science, quality and technical skill of ours, and that they possess less breadth of mind. Their inferiority is the result of the very method of obtaining them. Let us not forget that, by reason of more than secular traditions, the arm which is the favorite in France has been the outcast, and, so to speak, the Cinderella of the Prussian nation. When Count Saint-Germain, in 1776, called the masses to enter the "Royal corps," the democratic sentiments which animated France experienced a real satisfaction. Merit could then have its turn. A title could

be sought which was not due to the mere accident of birth, but to the personal value of the holder. If the admission of the children of the yeomanry to the artillery was tolerated by Frederic the Great, it was for a wholly different reason. He needed many officers, the nobility could not supply enough. He had, in spite of himself, to draw from other sources at the risk of making the Service common. The artillery was sacrificed. "He made a rule," wrote the Marquis of Toulongeon, in 1786, "that, in the hussars and artillery alone a private soldier might reach the commissioned grades, which was not allowed elsewhere in the army, where the grade of non-commissioned officer is the *ne plus ultra* of the soldier. The regiments are, therefore, filled with young men of family who would be elsewhere neither officers nor soldiers, and no fuss is made about their shape or bearing. So soon as they show any talent they are placed in the corps of bombardiers, whence come almost all the artillery officers." This origin explains the discredit of the arm, a discredit which, although weakened, clings to it even now. Surely, and in spite of some brilliant exceptions, the body of officers of the German artillery, taken as a whole, does not reach the average of ours.

As an offset to this our polytechnicians are reproached with having a too geometrical cast of mind. For example, it is claimed that their conception of the modern battle, as laid down in the *Instruction* of May 1, 1887, shows greater skill with the right-line pen than in the practice of War. "What you have given us," it has been said, "is a diagram and not the real thing. The successive phases of an engagement will not be spread out, like the acts of a tragedy, in distinct and clearly-marked periods, but overlap each other. Again, the ground will not always be adapted to posting batteries and infantry in an inflexible arrangement." Granted, but when rules are laid down there must certainly be a hypothesis as a starting-point. The debate is open between the partisans of the formulæ and the skeptics who, thinking it impossible to inclose within rigid lines what should be flexible in the Art of War, do not wish to curb inspiration and place genius in subjection to "theories." General Lewal has taken up the defense of the regulations very energetically. No, they are no obstacles to accomplishing bold attempts; at most they interfere with unthinking minds. But what precious assistance they give to others! They are strength for the undecided, ballast for those who are too light. It is enough to take them as they are, a scheme applicable to an ideal situation.

The before-mentioned *Instructions in the use of Artillery in action* draws perhaps an ideal that cannot be realized, but its tendencies are undeniably just. It fixes the tactics of the arm as the famous *Fascicules* fixed that for infantry; like them it has placed it on the side of the offensive, which alone, it says, "allows decisive results to be obtained," whereas "the defensive always shows a material or moral inferiority on the part of him who takes that course." It gives clear ideas about the duties of different ranks, and lays down on the subject of keeping up supplies of ammunition —a vital question—principles which seem to be very judicious.

In the *Artillery of the Future* as well as in the *Letters About Artillery*, the same complaints frequently recur; the group should be composed of

3 batteries, and not of 4; not 4 batteries but 6 should be assigned to a division of infantry. Neither Prince Hohenlohe nor the author of *Die Artillerie der Zukunft* was heeded in their country. Better inspired, we have followed their advice. Each of our infantry divisions is accompanied by 36 field pieces and an ammunition train, as much for cannon as for small arms. A colonel is at the head of this force; he is assisted by two majors (*chefs d'escadron*), each commanding 3 batteries or 18 pieces. The division is thus powerfully equipped; it is to-day a respectable tactical unit. Still more guns might be given to it by doing away with the "corps batteries," which, being under the sole control of the corps commander, gives him the means of intervening in the battle, either to support the advanced guard, to reinforce one or the other of his divisions, to fill a break in the line, or to cause a division of flank movement. The multiplicity of the parts shows the disadvantages which would arise from suppressing the corps artillery; it is the fly-wheel used by the commander-in-chief to balance his means of action or to make one of them preponderant. When, during the War of 1870, the general-in-chief of the Prussian Guard received a report which forced him to mount his horse, he invariably cried, "Get my boots and bring me the corps artillery." The coming of these batteries on the scene showed that the action was to be energetic; "therefore," says Prince Hohenlohe, "in the games of whist which the long evenings of the siege of Paris left us time to play, we used to say of a player who led his trumps, 'he is bringing his corps artillery into battery.' These are pleasantries, but they are typical and characteristic of the situation," adds the narrator. He continues as follows:

"We have less field artillery than adjoining States. Let us increase it then, if we do not wish to smart for it. Two more batteries for each army corps will put us in position to create in this corps, for each of its two divisions of infantry, a regiment of artillery composed of two groups, each having three batteries. The corps artillery would form another regiment of three groups comprising, consequently, nine batteries in all. This organization, which would answer to the use of our arm, would no longer involve any breaking up of regiments at the time of mobilization."

Well, we have this organization. It would be happily completed, if we conformed to the advice we have just read, and if, in time of Peace, the single divisionary regiment of twelve batteries existing in each of our army corps were divided into two regiments of six batteries. Unfortunately we are restrained by considerations foreign to the good of the Service; we draw back before the creation of new staffs; we fear to excite jealousies by increasing the number of colonels from forty to sixty. Nevertheless, everything is so well prepared and the steps taken are so simple that few mistakes are to be feared when mobilization takes place. The divisionary regiment will be "separated" into two; it will not be broken.

LETTERS ON INFANTRY.*

By PRINCE KRAFT ZU HOHENLOHE INGELFINGEN.

Translated by Lieut.-Col. N. L. Walford, R.A.

IV.

FIGHTING IN EXTENDED ORDER AND THE NEW REGULATIONS.

IN the further training of our infantry, in the marching drill of single men as well as in the instruction of squads and in the manual and firing exercises, we find the same care given to the training of each man as an individual as in the first elementary drill of the recruit. An infantry officer, who has done his duty thus from the beginning and has paid attention to nothing else, does not recognize the excellence of this system and its logical development so well as an officer of another arm, who, as I was myself, has been accustomed to see the foot drills carried out in masses, and is astonished to see how quickly these drills can be learnt, when they have been preceded by a careful training of the individual soldier. When a man can march well, that is to say naturally, freely, in an unconstrained manner, and firmly holding himself upright, proudly and with self-confidence, when the small squads marching at three paces interval can move straight to their front and wheel well, then the drill of the complete company is a mere trifle and can be easily taught.

How rich in results is the training of the individual soldier! This is one answer (I say one of many) to the question which I asked in my first letter, as to whence were derived the excellence and the superiority of our infantry. An important part must be attributed to the instruction of the soldier in fighting in open order and to his habit even in this of obeying the orders of his officer. Whenever this training of our soldiers has been properly made use of, there our infantry have obtained great success with comparatively small loss; but where the officers have attached little value to fighting in open order, they have suffered loss to such a degree, that success has often been doubtful and failure might even have occured, if it had not quickly been brought into use.

I have already in my first letter referred to an action which furnishes a proof how much smaller were the losses of regiments which attacked in swarms, than of those which advanced in company-columns. Allow me to mention here yet one other episode of battle, which I saw at Sedan.

We were standing in position to the East of Givonne, fronting to the West, with the village of Givonne, which was occupied by the rifles and fusiliers of the Guard, lying in the deep valley of the Givonne to our front. It was about 1 p. m. The enemy's infantry had drawn back from the opposite edge of the valley of the Givonne as far as the Bois de la Garenne, which stood on higher ground. A few companies of our infantry had made

*Reprinted, by permission, from Proceedings Royal Artillery Institution (Woolwich).

use of this opportunity to occupy the farther edge of the valley. One company of the rifles of the Guard had done so from Givonne in front of my line of artillery, while in front of the left wing of that line two companies of the "Franz" regiment, under Captain von C., advancing from Haybes, had taken up a similar position. The last two companies had crowned the farther edge of the valley, and had got under cover in a single thin line of skirmishers. The enemy's artillery fire was as good as silenced.

Suddenly to the South of the Bois de la Garenne a thick mass of the enemy's infantry rushed out of a hollow which runs from the wood to the Fond de Givonne, and charged as hard as they could run on Haybes, and therefore directly on these two companies. I judged these masses of infantry to amount to 5000 to 6000 men, and think now that that must have been about the right number, since, according to the French account, this must have been the left wing of Wimpffen's despairing attempt to break out (Grandchamp's division). The enemy's masses of infantry running up in deep columns, fired incessantly as they ran with their rifles held horizontally at the hip, and thus covered themselves with a cloud of smoke. You could distinctly see with a field-glass how the men loaded and fired as they ran, without raising their rifles to the "present." To the naked eye the mass looked like a gigantic advancing heap, blue above (the tunics) gray in the middle (the smoke), under which the red trousers and the struggling legs showed with a sort of trembling movement. Though I gave the order as quickly as possible to all the batteries of my line of artillery (90 guns), to open a rapid fire on the enemy's masses of attack, I could not help feeling very anxious about the two companies of the "Franz" regiment which lay on the other side of the valley of the Givonne, for if the enemy's masses succeeded in getting to within 200 paces of them, I should not be able to fire any longer with my guns at the head of the attack, on account of the danger of hitting our own infantry.

I had reason indeed to be nervous. Though the shells, striking and bursting in the midst of the thick masses of men, wrought horrible destruction, and threw them into confused heaps in which smoke and dust were mingled with the colors of the uniforms, while above them men's bodies and limbs were hurled up into the air by the explosions, the mass still came on nearer and nearer, for the enemy fought with the courage of despair The moment soon came when I was compelled to order the fire on the head of the column to cease. This head broke loose from the mass, and charged in on the companies.

In contrast to the thick smoke which was made by the rapid fire of the French, no fire could be seen to proceed from our companies. I turned my field-glass on them and then at last saw here and there the puff of a discharged rifle; the whole line of skirmishers lay flat on the ground, their rifles at their shoulders and their sights on their target. Captain von C. only walking up and down as gracefully as we often see him at a ball, moved along his line of skirmishers, and (as he told me afterwards), exhorted his men to aim quietly and shoot slowly. But each bullet struck down one of the advancing enemy; the number of those who drew near to the skirmishing line grew less and less; a few even reached the line, and there met

with their fate at the muzzles of the rifles, for two of our men lie there bayonetted through the back from above. But the whole attack, which was commenced with such boldness, died away. Only a few survivors turned to fly, and were shot down by the pursuing fire of the infantry. The whole mass was destroyed in the space of ten minutes! On the other hand the entire "Kaiser-Franz" regiment lost during the whole of the battle of Sedan only two officers and 80 men. Of this loss only a very small proportion was incurred by these two companies during the short episode which I have related. So great is the superiority of the well-aimed, well-directed, and good individual fire of troops, who have been well trained in detail, over shock tactics in mass-formation! It is not the offensive, as such, which has lost all use and value owing to the system of instruction and the perfection of fire-arms, but such shock tactics in mass-formation!

This was already made evident in the War of 1866 by the destruction of the brave Austrian columns of attack. But the greater part of the success of the Prussian infantry was to be ascribed to the superiority of the breech-loader rather than to the fighting formation, since our infantry also frequently used closed formations in this war. But in the example from the battle of Sedan which has been quoted, a mass-formation was employed by that force which possessed far the better infantry arm; and yet it could not stand against the inferior weapon, even though the proportion of numbers was 6000 to 300! Granted that the 300 were supported by an effective fire of artillery, and that this destroyed half of the column of attack, yet the odds will be still 3000 to 300, or 10 to 1. This superiority of individual fire on the defensive over mass-formations in the offensive must have increased since the infantry weapon has been yet more improved.

It is easy to understand how hard it is for infantry officers who have grown old and gray in the Service to give up their dear old fighting formations. But such formations as those of Frederic the Great, who personally led on to the storm his battalions deployed in close order with bands playing and colors flying, halting only at 100 paces from the enemy to fire a volley, are no longer possible in these days of Gras and Mauser rifles. The movement also, by which a brigade of 6 battalions, while the first line of 3 battalions fired volleys in line, sent forward its second line in columns of attack through the intervals in order that they might charge in with the bayonet, is no longer suitable to the present day. New inventions entail changes, and the old movements which we have loved pass away like dreams. We must make up our minds to this. The much-loved modes of fighting of the knights of the middle ages had at last to be given up, and no Arnold von Winkelried can now decide a battle by gathering the enemy's spears against his own breast, and thus making a breach in the armored ranks of the foe.

So also we must acknowledge that the charm of a well-dressed advancing column of attack (battalion-column on the centre companies), as it moved in step to the tap of the drums, is gone forever, since it must lead to the destruction of the assailants. Even the term "column of attack" has been changed in the last regulations into "column on the centre;" a proof how entirely we have renounced any idea of using the old column

of attack within the zone of fire. Even the use of the smaller company-column has been to some extent given up within the zone of very effective fire. In nine cases out of ten it will serve only to feed the fighting lines of skirmishers, and it will but rarely happen that a closed formed company-column will be brought up into the front fighting line to work out the decisive struggle. Seldom indeed; but its effect will then certainly *be decisive*. Thus it may be used by night, when the darkness will diminish the effect of arms of precision, or if smoke or their own loss has physically or morally blinded the eyes of the defenders, or if the ground affords cover to the advance of company-columns which may take the enemy by surprise. But the essential point of infantry action will always be the individual action in the fire-fight, and that infantry will gain a decisive superiority which has understood how to train each individual man so that he can make the best possible use of his rifle, and has thus learned to follow the signs, the orders, and the example of his leaders. For of what use is an effective fire, if it is not carefully directed on the most important point? The real difficulty of the training lies in teaching the men to steadily follow the directions of their leader, in spite of the (so-called) loose order, and to preserve discipline. This combination of discipline with individual action was the cause of the superiority of the German infantry in 1870–71, and will make any infantry superior to that of the enemy, if the latter has not attained to the same standard.

This is well known among us even in the highest ranks, and all the changes which have been made in the regulations, as shown by the infantry regulations of the 1st of March, 1876, point to this end. We not only see, as I have said above, the old "column of attack" done away with altogether, and its place taken by the "column on the centre," to be used only as a rendezvous-formation outside of the zone of the enemy's fire. The formation in two ranks (company-columns) is in the 14th chapter expressly laid down as the regular fighting formation, while the greater part of the regulations deal with the application of "fighting in open order."

The changes which have been made show that the highest authorities of our army have used the experience of a victorious war to carry out improvements, and have thus acknowledged that some deficiencies did exist. We need not be ashamed to own this; we should rather glory in it. Indeed, if we look closely into the phases of our battles, we shall acknowledge that our infantry, especially when they met the enemy for the first time, were exposed to his fire in columns which were at once too strong and too deep, and that this was the principal cause of the heavy losses in the earlier battles. I might, for instance, as an eye-witness, make mention of the Guard corps, though I saw it only from a distance, since during the battle of 18th of August (Gravelotte) I stood in the centre of the line of artillery, and thus at a considerable interval from the main infantry fight.

However I need not enter at any length into the details of the attack of the infantry of the Guard on St. Privat, since you will already have read and heard enough about it, and since you know that the losses of this infantry in front of St. Privat have been the principal cause of the many propositions and experiments as to how, given that a force acting on the

offensive must cross open ground, it may best avoid such colossal losses by means of some other tactical formation.

You can form some idea of the terrible effect of the fire, when I tell you that a flock of frightened sheep, which burst out from Ste. Marie and galloped across the front of the Prussian infantry, and which were, perhaps in the dust which they raised, mistaken by the enemy for cavalry, were killed down to the last sheep. They afforded a most welcome meal at the bivouac of the Guard corps on the following day. There are situations in battle in which the hearts of men are so affected by the sense of danger, that there is an end of all manœuvring; they can move neither to the right or the left, and can only advance or retire. After they had once unexpectedly come under this fire of the enemy, which they had undervalued beforehand, only a forward movement was to be thought of, and the officers, recognizing this, shouted nothing but, "Forwards! Get on!" Thus it came about that shock-tactics, which four years before had failed before our fire, had now apparently to be used by us. But fighting in extended order soon developed itself out of the combat in masses, since the fearful gaps which were caused by the enemy's bullets destroyed at once the cohesion of all closed bodies, and broke them up into swarms, which—Honor to the Heroes!—continued to advance, until they arrived so close to the hostile position that they were able to answer the fire of the foe. At this point they received the order to lie down and to take cover (which was very imperfect) in the folds of the ground and in the furrows, to beat down the enemy's fire with bullets, and thus, with the assistance of the batteries which had pressed forward with them, to prepare the way for the storm by a long fire-fight, for the assault couid not be fully carried out until the left wing of the XII. corps was in a position to assist by a flank attack.

I have not watched the fighting of the infantry of other bodies of troops with sufficient closeness to enable me to form a settled opinion with regard to it, but the proportions of the losses in the earlier and the later battles give such strong evidence on this matter, that I am inclined to believe that the details must, in general, have been much the same.

The brilliant author of the work, "The People in Arms," comes, it is true, to another conclusion. He cites, amongst others, the instance that the whole of Werder's army, in the three days' fight on the Lisaine, lost only as many men as a single regiment of infantry in the battle of Vionville-Mars la Tour. From this he concludes that the longer the duration of a war, the more does the energy with which it is conducted fall off. I must own that, so long as the War lasted, I noticed no falling off in the eagerness of our troops to push on. Quite the contrary. When General von Budritzky, on receiving the order to storm Le Bourget, on the evening of the 29th of October, sent in answer the following message to the general in command: "The first shot shall be fired at 8 A. M.; at 9 A. M., punctually, I shall be in Le Bourget"; his infantry did not fail him. They pushed on with such impetuosity that punctually at 9 o'clock he was able to step over the barricade at the Northern entrance. But the leaders had become more careful in the employment of fighting formations, after they had recognized that those which had been used up to that time, and which

were laid down in the regulations, were not all suitable for every emergency. It is certainly not desirable, as a rule, to depart from the prescriptions of the regulations, but when one sees that the conditions are different from those upon which the regulations were founded, it then becomes necessary to do the best for oneself that one possibly can. But, if the needful changes have not been made in good time, that is to say in Peace, this knowledge will be bought at a terrible price. The changes in the regulations which were made after the War fully recognized this necessity.

These changes in the regulations, which are laid down in the new edition of the 1st of March, 1876, have certainly not satisfied all who have thought over the need for such modifications. It was scarcely possible that they should do so, since opinions differ so widely, while the propositions made were so many and so clever, that some of them may be considered as more brilliant than practical. But the new regulations were founded upon the whole progress of long-range weapons. The elasticity of the regulations, the freedom which is permitted to everyone as to the formation to use in any particular case, the margin which is allowed with regard to the intervals between closed bodies of troops and the firing-line, and, above all, the formal order that the instructions contained in them are alone to be observed (which forbids the narrowing directions of other authorities), renders it possible for leaders in War to select always that which is right, and to adapt their movements to the ground and to the dispositions of the enemy.

LETTERS ON ARTILLERY.

By PRINCE KRAFT ZU HOHENLOHE INGELFINGEN.

(From the Abridgment of Capt. Toutée.)

Translated by Major W. L. Haskin, U. S. A.

V.

UPON THE LOSSES OF ARTILLERY MATERIAL IN THE CAMPAIGNS OF 1866 AND 1870.

IN 1866 artillery abandoned its position for three causes:

1st.—In order to refit after being overmatched by the enemy's artillery.

2d.—To renew its ammunition,

3d.—To escape infantry fire.

Neither of these three reasons was deemed sufficient in 1870, and, in fact, the artillery never abandoned its positions except when ordered to do so by the officer commanding the troops engaged.

And, at first sight, is it *ever* necessary that a battery should retire to the rear to refit?

"A dismounted battery is useless," they say, "and is it not better to send it to the rear than to let it fall into the hands of the enemy?"

No. For a retreat of the artillery has a most unfavorable moral effect upon the other arms, who consider it as the stable element of the line of battle.

It is the thunder of the cannon which, as a Herald-at-Arms, announces and signifies to the two parties the taking possession of ground by one of them.

One can imagine how a dismounted gun can give the appearance of a dismounted battery.

The first piece has had all its horses killed or wounded by a single shrapnel.

The carriage of the second piece has two wheels broken.

The third piece has been struck on the muzzle by a projectile, and is entirely unfit for service.*

The limber of the fourth piece has been blown up.

The sight of the fifth has been broken off by the bursting of a shell.

The sixth has its breech-block damaged.

Here is a battery which is certainly not in condition to fire one shot, and in 1866 it would have been withdrawn from the field,

If, however, this battery receives an order to hold its position, what does it do? The first piece is given four horses from the third; the second, two spare wheels from the line of caissons; the fourth takes the limber, the fifth the sight, and the sixth the breech-block, of the third. And in ten minutes this battery will have five pieces fit for action.

The true manner of relieving an artillery line which is not strong enough, is to re-enforce it, and not to withdraw it.

It is plain that if a battery is obliged to quit its position because it is not strong enough to hold it, the battery which will replace it will have to withdraw for the same reason, and the result will be that we shall have exhausted all our resources drop by drop.

During the battle of St. Privat many of the pieces of the Guard artillery had lost wheels,—had had their limbers blown up; but not one of them quitted the field of battle.

They made the necessary changes where they stood, so thoroughly that when the advance was resumed three cannon only were left upon the battle-field.

"These three guns would undoubtedly have been lost if we had been forced to retire instead of advancing. But had we sent the batteries to the rear to repair damages when a gun had been dismounted, there might have come a moment in the struggle when there would have been no artillery in this position, in which case the battle at this part of the field would have been lost. The retaining of the dismounted guns in the line of fire did in this instance expose these guns to the danger of being captured in case we were driven out of our position, but the simple act of leaving the fate of these three dismounted field pieces to be determined by the result of the battle may have so influenced the course of the action as to secure us against the supposed case of retreat."†

* Gen. Hohenlohe says that in 1866, a bronze 24 pdr. at Mayence was struck on the muzzle by a blow so powerful as to twist it and render it entirely unfit for service; but, he adds that this is so rare a case, that all the German artillery might fire for many years without obtaining the same result again.

† From the German, by Col. Hughes.

At the battle of Sedan, fragments of wood and iron flew in all directions, but the supply of spare parts sufficed for all needs.

"A carriage, which I saw behind the wood of Villers-Cernay had given first the wheels that it carried, and then its own wheels, and it laid on the ground, completely despoiled, making so woeful an appearance as to remind one of an old torso dug up from the excavation of the Forum."

"If the enemy were not so well armed as we were up to the time of putting in service the '*canons de 7*,' he, nevertheless, made such great use of masses of artillery that the quantity of his projectiles compensated for their want of accuracy."

As to the failure of ammunition, it was the reason most frequently given in 1866 for leaving the field.

In 1870, the supply was never deficient, although the expenditure was much greater,

For instance, the six batteries of corps artillery under Colonel Dresky, fired at Rezonville 5699 rounds. The artillery of the Guard expended 8000 rounds at St. Privat, and at Sedan more than 5000.

Altogether it used 25,000 projectiles, which exceeded the war allowance for an army corps.

It is possible to cite very rare cases such as that of the battery short of ammunition near Chateaudun, whose cannoneers mounted upon the chests to sing the *Garde du Rhin* as though amusing themselves.

But in general, the supply of ammunition was abundant in the last campaign, and this subject is so important that the author treats of it, later, in a special manner.

The examples drawn from the War of 1870, show that this artillery which dared not confront infantry in 1866, could brave, four years later, its formidable fire.

Without taking into account such heroic deeds as those of the batteries which climbed the Roth Berg at Spicheren—which at Wissembourg took position upon the border of the moat—or which penetrated into burning Bazeilles, it is sufficient to announce that the German artillery adopted the rule of advancing under the fire of infantry, and considered it its duty to hold firm under its fusilade.

The greater part of the artillery engaged at Spicheren sustained itself upon the Folster Berg under a heavy fire of infantry.

At Woerth eight batteries advanced under fire to prepare the way for the assault upon Elsasshausen; twenty pieces did the same at Frœschwiller. At Vionville, Mars-la-Tour, the 210 pieces of artillery were under a most destructive infantry fire during the whole of the engagement. At St. Privat, the artillery of the Guard, which lost the fifth of its personal and the fourth of its horses, could attribnte three-fourths of its losses to Chassepot bullets. A triple line of the enemy's skirmishers held ground scarcely 1000 yards from it and annoyed it during the whole battle.

Later, the artillery of the Guard took position between 300 and 500 paces from the enemy's infantry. Half the pieces, it is true, were left upon the road, but the remainder sufficed to assure the occupation of the position. In all the army corps the batteries acted in the same way. Those even which lost all their *personnel* before St. Hubert did not, on that

account, flinch from the fire of the enemy; they held their ground; other cannoneers placed themselves at the pieces and they continued to render service.

It was the same at Rezonville and at Beaune-la-Rolande.

Thus the old sterotyped phrase of all the professors—of all the judges of manœuvres, "Driven back by infantry fire," was shown to be erroneous for an artillery which—not being willing to retire—was never driven back.

VI.

HOW IT IS POSSIBLE TO BRING THE ARTILLERY UPON THE FIELD OF BATTLE AS SOON AS ITS SERVICES ARE WISHED FOR.

The employment of artillery in heavy masses has, since the time of Napoleon, been so completely incorporated among the general principles of tactics that armies have ever since been so constituted as to render it possible to bring up at the desired moment the artillery necessary for a combined action—a decisive effort.

Hence the organization of artillery reserves, which were judged necessary in order that they might be held in masses in readiness for action.

It is clear that at the time when pieces advanced to within 500 or even 300 paces of the enemy, in order to obtain the decisive effect which was demanded of them, it was impossible to quit this position to take another more favorable one. Still less could the artillery be required to change the direction of its fire. Once engaged in the heat of an action the artillery could no longer be disengaged. Until the general had discovered the decisive point, therefore, he was obliged to guard, without employing all the pieces destined for action there; these he held in hand, and these only.

But now that the range of field artillery extends beyond 4000 yards and that artillery can wage a decisive combat at the distance of a mile, it is no longer difficult to change the position of those pieces which are not engaged in the principal attack, and further, many of them can, without quitting their positions, converge their fire upon a definite object. There is then no longer a necessity for keeping them in action during all the period which precedes the decisive attack.

These principles are to-day so well established that one is tempted to ask why they were not announced in 1866 when the rifled cannon was given to the Prussian artillery.

It is because truth comes slowly to light.

The new material had just been received and its adoption had met with tenacious adversaries amongst the heroes of the War of Independence.

One of these old veterans pushed his aversion so far that on his death-bed he forbade the firing of the salvoes of honor over his grave except from smooth-bore pieces.

The Austrians had the experience gained in the War of 1859, and they profited by it. Their artillery in 1866, from the very beginning of an action showed itself prompt to act in masses. It is true that they brought also into this campaign an exaggerated estimate of the value of the offensive by

shock, and that this imitation of the French tactics cost them dearly in Bohemia.

Although the teachings of the campaign in Lombardy were well known, the Prussian army nevertheless persevered in its employment of its fire. The single Austrian idea borrowed appears to have been the constitution of an army reserve of artillery, for, after the example of Austria, 96 pieces were assigned to the First Army under this name.

But, on the other hand, this artillery was not designed to appear upon the field at the beginning of an action, as was that of the Austrians.

When we observe that the reserve artillery of each corps marches behind the last of its combatants, it is easy to comprehend that it is only by the greatest efforts that the principal masses of the artillery can reach the field of battle by the end of the day.

Thus, at Muenchengratz, and at Gitschin, the reserve artillery did not appear. At Trantenau, Nachod, and at Soor, they arrived either very late or at night-fall. After the first actions, however, orders were issued with the view of bringing the artillery earlier upon the field, but the traditions of a whole army are not modified in a day, and great friction was developed by the new functions demanded of the organs of this immense machine The commanders of the infantry divisions, among others, always hurried their troops into action, refusing often to let the artillery pass them. Nevertheless a certain change had been produced by the time Sadowa was fought and two divisions of the army reserve succeded in arriving upon the line shortly after the passage of the Bistritz.

Hohenlohe also brought up the reserve artillery of the Guard but a very little time after the advance guard was engaged. But at the price of what effort? The horses, he says, fell dead in their tracks. The distance between the bivouac of Rettendorf and the artillery position at the south of Jericek by way of Kœninginhofet, Chotieborek, is almost 14 miles, and the corps artillery traversed this whole distance at a steady trot, in spite of the hilly nature of the country, and of the fact that it had to cross fields, the road being occupied by the infantry.

"The single reason for all these difficulties was that our place according to regulations was at the tail of the column.

"Moreover the Prussian infantry in 1866 had such confidence in its arm that it moved directly to the attack regardless of numbers and arm, and masked our own artillery, and would not wait for the arrival of the reserve artillery."

Certain generals of infantry even made it a point of honor to do without artillery. Such presumption would have cost them dearly in 1870, but ideas had changed then. Far from sleeping upon their laurels the chiefs of the Prussian army, comprehending the danger incurred in leaving the reserve artillery inactive, commenced by rebaptising it. The reserve of each corps received the significant name "Corps Artillery." Every one knows that henceforth when the Army Corps was engaged this artillery would form part of the fighting force.

At the same time, and in consequence, the order of march was modified.

In 1870 the battery of the advance guard marched almost always behind the first battalion; the division batteries behind the first regiment; the Corps

artillery behind the first brigade. If there were two roads the corps artillery marched behind the first brigade of one of the divisions. If there were three lines of march the corps artillery took the centre one nearly up with the head of the column.

We had thus, by the simple fact of the adoption of such an order of march, two-thirds of the artillery in line before a quarter or at most a third of the infantry was deployed. But, further than this, the employment of the artillery was still more assisted by the use made of rapid gaits in deploying. Lines of artillery from 3000 to 4000 yards in extent came into action when the infantry had scarcely reached the field. Often the wing posted farthest from the road had no other support than cavalry (Vth and IXth Corps at Sedan). At other times masses of artillery preceded the infantry at a great distance, not without running the greatest risks (IXth Corps at St. Privat).

Finally, the instruction of the artillery during Peace had been modified in such a manner as to prepare this arm for the part it was now expected to play.

In the time of smooth-bores it was possible to stand fast, to manœuvre, and to take any disposition at 2000 yards from the enemy. When the batteries were ordered to engage it was only necessary to advance 1200 yards to reach fighting distance (800 yards).

It was then easy to do this at a rapid gait and this rapidity was also very important, for, at such a distance, the enemy discerned all movements and any delay in the zone of combat would have fatal results.*

Now on the contrary, at the great distance at which fire can be opened, the enemy will seldom see the pieces until they have commenced to fire, or rather, until they have shown themselves in battery. It is no longer a question of gaining a few seconds in order to fire the first shot, for, at present ranges, it is necessary to take time at the beginning to point carefully and to see the effect of the shot. It is a question now of gaining many hours on the enemy in taking up a position before him.

The corps artillery, supposing that it marches immediately after the first division, is at most about four miles and a half from the head of the advance guard. This advance guard meets the enemy and its chief sends for the corps artillery. An hour later, which includes the time required for the transmission of the order, and that artillery should be in position.

Such was the manner of exercise that the inspector-general of artillery demanded of all the artillery regiments. Each endeavored to traverse long distances at a steady gait rather than by allowing short intervals of the trot-out or the gallop.

The corps artillery of the IIId and IXth Corps at Vionville and that of

* At the battle of Sedan the artillery of the Guard at first trotted without change of gait over nine miles, from Carignau to Villers-Cernay. Then I dismounted, in order to let the exhausted horses get breath. After five or ten minutes, devoted to the reconnaisance of the ground, the batteries climbed the slope.

They did not come dashing into battery at a gallop, but moved painfully at a walk. The cannoniers, the fusileers of the Guard, and the hussars pushed at the wheels. These batteries had gained hours and therefore could afford to use the time neccessary for selecting suitable ground and for establishing themselves there.

the Guard at Sedan, made marches similar to that made by the reserve of the Guard between Rittendorf and Jericek.

Even more is demanded of the artillery when it is required to pass from one wing to the other of the line of battle. Witness the 1st Horse Battery of the Guard which, on the 13th of August, travelled 32 miles from Bermering to Dieulouard and went into action that evening; witness also the 3d Horse Battery of the Guard which came from St. Mihiel to St. Privat to take part in the action.*

Besides, in all the Prussian artillery, each one was spurred by an ardent desire to show the progress realized since Sadowa.

"As we approached the enemy's position at St. Privat on the 18th of August, I received instructions from the commanding general, after he had reconnoitered the enemy's position, to order up the corps artillery, which, on the march, should follow the 1st Infantry Division of the Guard. I sent an adjutant off with the necessary instructions and then turned to the commanding general to express to him my views of the situation and to see that they were in accord with his. But my first sentence was interrupted by Colonel von Scherbening reporting 'The corps artillery is here.' I was taken by surprise. 'How do you come here now?' 'Lieut. B. brought me the order.' 'But,' said I, 'you were to march in rear of the 1st Infantry Division of the Guard.' 'And there I was,' said the gallant colonel, 'but upon hearing the first cannon shot at the front I caused the batteries to trot,—there is plenty of room here alongside of this infantry division, and I said to myself, if they will not make use of me, they can halt me and let me wait.' In fact the whole mass of the corps artillery in battery columns trotted forward on the left of the 1st Infantry Division and filled the air with the thunder and rattle of a hundred carriages. It thus happened that the corps artillery, in addition to the artillery of the 1st Guard Division, was brought into action by battery, and the Guard Corps was able to open the action with 54 guns long before the first of the Infantry had reached the zone of the enemy's shells.

"As the outlying batteries of the enemy upon the heights of St. Privat were withdrawn, this line of artillery pushed nearer, by battery, in order not to waste ammunition by firing at too great a distance. Fortunately, I at this moment received authority from the commanding general to go to the front and direct the fire. From my point of observation on the heights I could see that there was a heavy line of skirmishers lying concealed in the furrows of the open fields, watching the advancing artillery in order to destroy it. The battery chiefs could not see this line from the lower plain on which they were moving. I arrived just in time to stop, in accordance with the instructions of the commanding general, any farther advance.

"Troops that find so much pleasure in a fight that they leave nothing to do but to caution them against too bold an advance, are very easily concentrated and the mass can act with great promptness."†

* Dresky relates that on the 6th of August his batteries had reached Ottweiler after a march of 13⅓ miles, when he received at 3 o'clock an order to take them to Sarrebruck. At half-past three the Corps artillery moved. Sarrebruck was distant 21 miles. At half-past six the batteries of horse artillery were upon the field of battle; at 8 o'clock the mounted artillery arrived in its turn.

† From the German, by Col. Hughes.

Military Notes.

AN OFFICIAL REPORT OF THE JUDGE ADVOCATE GENERAL OF THE UNITED STATES.

(*Translated from "Die Nation," Berlin, March 9, 1889*).

SOME years ago I undertook, in connection with the work of the late Professor von Holtzendorff, to call the attention of German readers to the memory of Francis Lieber.

Lieber, who, when a mere boy, took part in the campaign of 1815, and afterwards, during the sad period of the Carlsbad Decrees, was forced to leave his native country, was one of the veterans and noblest ornaments, of the German colony in the United States. As professor and jurist he labored during a long and busy life in the interest of the intellectual union of the lands of his birth and adoption.

It is gratifying to see the name of Lieber, in the second generation, gaining honor and consideration in the great Western State. G. Norman Lieber, son of Francis Lieber, holds the office of Acting Judge Advocate General of the United States Army, an office corresponding with that of "*General-Auditeur*" in our Army. In this capacity he has made an official report, for the year 1888, to the Secretary of War of the United States, which has been printed at the Government Printing Office, and has been kindly sent me. Some of the facts which it presents will be of interest to German readers also.

As is well known, the comparatively small Army of the United States consists of troops enlisted for pay. Whilst we have a comprehensive military criminal law and procedure for our Army—which is, in fact, "the people in arms"—entirely superseding the civil law, military criminal jurisdiction in the American Army is confined to disciplinary measures. These are codified in the Articles of War, of which some are noteworthy: Article 19 makes punishable contemptuous or disrespectful words towards the President, Vice-President, the Congress of ths United States, and the Chief Magistrate or Legislature of a State. Articles 26–28 are expressly directed against duelling, promoting a duel, or upbraiding another for declining a duel.

Lieber justly animadverts upon it as a great wrong that the majority of these Articles of War authorize imprisonment, or punishment, without prescribing any *maximum or minimum limit*. Inasmuch as the trial is by courts-martial, composed only of officers, convened for special cases, and, therefore, of ephemeral existence, it follows that no uniform practice can grow up. This, together with the unlimited punishment, leads to great difference in the application of the penal power, and as the only remedy

for the inequality it becomes much too frequently necessary to resort to the exercise of the President's pardoning power. Lieber clearly shows how injuriously this works, substituting, as it does, arbitrariness in the place of established law.

Commanding officers, therefore, evade, as much as possible, the jurisdiction of courts-martial, and attempt to help themselves by resorting to such limited measures of discipline as extra tours of duty, extra guards, deprivation of privileges, etc., measures which will be unpleasantly remembered by every one who has worn the cloth in either country. Resulting from this again there is an extraordinary difference in the number of trials at different posts, varying, for example, as regards the garrison courts-martial in the Department of Dakota from 0 to 98 per cent. of the strength of the different garrisons.

The candor with which this defect is freely exposed gives reason to expect that a remedy for it will be found much more readily in that vigorous young State than, elsewhere, relief from a much worse condition. When Lieber, referring to these defects, concludes that "our Articles of War are inherited from a past age, and stand in need of being adapted to the circumstances and principles of the age we live in," we would like to know what his judgment would be with regard to the military jurisdiction of his father's fatherland. "Inherited from a past age"—ah, yes, a very past age, indeed!

HUGO PREUSS.

AN UNPUBLISHED LETTER OF FRANCIS LIEBER FOUND IN A VOLUME OF "CIVIL LIBERTY AND SELF-GOVERNMENT."

MY DEAR SIR:

Although the great War will not be ended these many months yet, the cessation of the fighting in the open field marks a sufficiently distinct period for a citizen to express to you, however inadequately, what we all owe to you in this, the largest and intensest contest of this century, which began with Napoleon's vast wars. You organized and sustained the greatest host of which man knows, and you withdrew it from the field prompter than monarchy or republic ever before has called her legions back to their peaceful homes, so that, instead of threatening liberty, they may go and work for her as good and true citizens by their vote, as they have fought for the same Cause in many battles.

Place, if you please, the accompanying volumes among your books, so that, one of these days, they may be found as tokens of my most sincere sentiments. A man gives according to what he has. I possess no other wealth than my love for my country and for Freedom, and traces of this may be found in the pages which I now venture to offer you.

Accept my highest regards, and believe me, my dear sir,

Your most obedient friend and servant,

FRANCIS LEBER.

NEW YORK, *10 August, 1865.*

Hon. EDWIN M. STANTON, etc., etc., etc.

ERRATUM.

Page 384.—Signature to "Unpublished Letter" for "Franciis Læber" read *Francis Lieber.*

FRENCH FIELD ARTILLERY.

(Translated by 1st Lieut. Luigi Lomia, 5th Arty., from "The Revista Artiglieria e Genio.")

The "Militär Zeitung" taking occasion to examine a recent article in the "Revue des deux mondes," in which the great superiority, in every respect, of the French field artillery over that of Germany, is claimed, describes what the conditions of this arm in France are really found to be.

The German periodical recognizes that as regards the "matériel" with the innovations introduced in the last few years, the French field artillery has, indeed, made great progress; examining, however, the improvements adopted, logically concludes that it is only, at best, on the same footing with the German artillery. The only advantage over the lattter being the adoption by the French of the smokeless powder, provided such an explosive be found really adapted to the uses of War. As regards the organization, the "Militar Zeitung" says, that the superiority of the French field artillery over the German is incontestable. In fact, it consists, on a Peace footing, of 380 field batteries and 57 horse batteries, making a total of 437 batteries, while the German artillery has only 318 field batteries and 46 horse batteries, making a total of 364 batteries. Computing, now, the strength of men and horses in the two artilleries, after subtracting the detached batteries on the borders, which have a greater numerical strength, the French field artillery is found to consist of 43,500 men and 27,700 horses, or thereabouts, while the Germans have 35,500 men and 19,400 horses. Therefore, the French artillery exceeds in strength that of Germany by 3000 men (22½ per cent.) and by 8300 horses (42 per cent.).

If we consider that the total French forces on a Peace footing exceed only, by an insignificant number, those of Germany, it is necessary to admit that, with regard to the artillery, there exists a great numerical disproportion—such as to point out or call for serious improvements in this respect, *since the force under arms, on a Peace footing, not only has a great influence upon the general instruction, but also upon the fighting ability of the troops, especially when it becomes a question of a complicated arm, such as is the artillery.*

Up to this time the French batteries have been united in groups (brigades) of four batteries each, to each division one of these groups was assigned, and the artillery of an army corps consisted of two of these groups.

Recently, after the fashion of the Germans, the groups have been formed of only three batteries, to each division being now assigned a regiment of two groups, that is, six batteries. The artillery of an army corps consists also of six batteries, with which it is the intention to form a special regiment.

Therefore, in an army corps, after subtracting the horse batteries, there are 18 field batteries, a number which is greater than with us. Furthermore, the Peace formation, even without the special regiment of the army corps, is more convenient than ours, because the six batteries, even in time of Peace, constitute two (2) groups belonging to the same regiment, while with us, as it is well known, the regiment of the army corps is formed by

batteries taken away from three brigades, which form part of two different regiments—a sufficiently unhappy combination indeed.

THE BATTLES OF THE FUTURE.

The British Army may be divided in two tactical schools—viz., those who believe with the Adjutant-General and Colonel Macdonald that drill and manœuvres are about as useful to a soldier as a knowledge of the hornpipe and those who do not, To the latter class we ourselves belong. Without balancing the weight of opinion on both sides for and against our contention, we intend in the following lines to formulate, in more precise terms than have hitherto been used, our reasons for holding to our faith. We hold that recent mechanical improvements in weapons have again restored the balance which existed between the three arms in the Napoleonic era. Roughly speaking, shrapnel fire is to the artillery of the present day what case was to its predecessors, and what the bayonet was at the commencement of the century. As regards cavalry, though here, of course, there is no mechanical improvement to note, the improvement in the stamp of horses, in their riding and training, and the diminution in the weights carried—already considerable, though nothing to what we look for in the future—has rendered them capable of again delivering the shock against the looser formations and hyper-excited troops they are likely to encounter on the battle-fields of the future. Moreover, the armament and training of the troops on the Continent are now everywhere about on an equality; and there is nothing to lead us to suppose that any one nation will, in the coming campaign, be able to develop against its adversary such a crushing superiority of either infantry or artillery fire as the Germans brought against their adversaries in 1866 or 1870. For these reasons, we believe that the aspect of the modern battle-field will tend to approach again to the type laid down by Clausewitz in his work "Vom Kriege,"—a mutual slow wrestling between the first lines of combatants, in which the strength, both moral and material, of both sides will expend itself, and the issue of the struggle will eventually be determined by vigorous blows from the reserves—which we expect to see handled on purely Napoleonic principles. It will be evident to those who have studied the history of recent campaigns that this feature—viz., the employment of the reserves—was conspicuously absent from the decisive battle-fields of those wars. Neither at Sadowa, Gravelotte, or Sedan, were the actual battle reserves called on to play a part any way proportionately to the magnitude of their numbers; indeed the conduct of the battles throughout can hardly be taken as a model, the conditions, both material and moral, under which the combatants met being such as to justify the German leaders in adopting a dangerously dispersed style of fighting, which more than once led them perilously near to defeat. A little more pace in the great cavalry charge of the Austrians at Sadowa, backed up by the advance of large reserves, and the Prussian line might easily have been cut through, with results as far-reaching as any in history; and, similarly, a correct use of the Imperial Guard at St. Privat might have completely changed the fortune of the day. But the actual results justified the German leaders in their confidence of the super-

ior fire-discipline of their troops and the initiative of the subordinate leaders, and proved more conclusively than ever the truth of Clausewitz's favorite axiom that war is above all things a game in which the human faculties come into play and cannot be brought within the limits of an exact mathematical science. Though the conditions of armament and the letter of tactical regulations now stand everywhere on much the same footing, it may yet happen that superiority in the spirit of the troops on one side may again lead to battles being fought and won in much the same fashion; but it would be very short-sighted to attempt to base our fighting formations on such superficial reasoning. Rather we must found them on the probable results of an encounter between approximately uniform troops on either side; and if we do, we shall find that the tendency is distinctly to recur to the Napoleonic type. It is customary, nowadays, to write and speak as if the battle is won with the delivery of a successful infantry assault on a point of the enemy's position. But what will happen if the enemy refuses to consider himself beaten, and renews the fight with fresh troops? Suppose troops mixed up in the inevitable confusion of a successful attack, in no matter whose pet short-cut to victory, in the shape of an attack formation—it is certain that at least half the officers will be down, and that the nervous condition of the survivors, both men and officers, will hardly be favorable to prompt, decisive action. Assailed suddenly by the attack of such avalanches of cavalry as were employed in last year's German mnnœuvres, whether ultimately successful or not, the scene will at least equal in wild confusion the one which took place on the Plateau of Illy, at Sedan, when the French cavalry tried to break through, with a result, which, to quote the Prussian official account, "for half an hour defied description." If during this time a mass of batteries is brought up to case-shot, or, at any rate, short shrapnel range, and fire is poured almost indiscriminately into the seething mass, whilst at the same moment a couple of brigades of infantry are advancing to the counter-attack, we get a picture totally at variance with the ideas on which our peace-time formations are based. The ground would be covered with riderless horses, runaways and stragglers from the previous encounter. What hope could there be of bringing the counter-attacking troops up to the enemy in the customary extended-order formation? Look at the picture from the opposite side, and the result is the same. The truth of the matter is that similar causes would again produce similar results, and a formation of lines of small columns would again have to be resorted to, just as they were a century ago. Advancing through the dust and confusion, these small columns would encounter each other at short range, and then the magazine-rifle would take the place of the bayonet in deciding the result, and the troops who could stand just a little more pounding than their adversaries would again, as at Waterloo, be victorious. But what sort of training must we give our men to enable them to face the demoralizing influences of such encounters? Can any one seriously maintain that our present system of instruction will meet the case? The constant harping on the necessity for taking cover and avoiding losses, the tendency to tolerate a slovenliness of drill, and, indeed, a neglect of the real fundamental ideas of drill itself, are not calculated to give the men

that absolute steadiness under fire, and contempt for death, that the drill of the old Peninsular days certainly did give. We do not, of course, wish to see a return to the senseless routine drill, whose object was solely to fit men for marching past. The problem is a far more difficult one than that. But what we want to secure is an intelligent combination of the two systems, such as may be seen, by those who take the German Army as their model. The instruction with the Germans is such as to bring out the whole individuality of the man when thrown on his own resources, yet the men are trained to obey every order "with the whole exertion of both mind and body," as their new drill-book lays down. This should be no new thing to us, for the germ of the idea exists in every smart drill-serjeant's being; only, as a rule, it ends there.—*Army and Navy Gazette.*

PROGRESS OF ENGLISH ARTILLERY, 1888–89.

About twelve months since a question was asked in the House of Commons as to the number of varieties, at that time in existence, of service rifle guns. The official reply was *seventy*. This included all modifications of the various calibres—known in artillery parlance as Mark I., Mark II., etc.—which were liable to affect the classes of projectile that could be employed with them. As a matter of fact, the actual number of weapons of different calibres and classes was thirty-nine. This number was not seriously increased in quantity during the last official year. But when we come to the question of quality a very different story has to be told. The numbers given by the War Office did not include any of the quick-firing weapons of cannon calibre with which such remarkable results have been lately obtained both in naval and military experimental practice. We allude to such weapons as the Hotchkiss and Nordenfelt 3-pr. and 6-pr. and the Armstrong 36-pr., or rather—as modified—44-pr., all of which have been introduced as service weapons, and the Hotchkiss 33-pr. and Armstrong 100.-pr., now under consideration. The very smallest of these calibres admits of the employment of a shrapnel shell; hence the designation of "cannon," as distinct from machine-gun, is applicable to them. The employment of such weapons seems destined to effect a complete revolution in the conditions of warfare. Let us take as an illustration the 44-pr., of which the secondary batteries of the Nile and Trafalgar, as well as those of the ten battle ships about to be built, and the entire armament of the smaller cruisers, is to consist. This gun has a calibre of 4.724 in., weighs only 34 cwt., and has a muzzle velocity of 2380 ft. per second, penetrating armor-plates to the extent of 10.5 in. at the muzzle. It thus approximates very closely in power to the 6-in. steel breech-loader of five tons, the latest effort of which has been to pierce the same thickness of solid steel plate with a steel shell. But the 6-in. gun is a "100-pr.;" hence the comparison as to relative power is greatly in favor of the Armstrong quick-firing gun. When, however, we take into consideration the fire effect produced by the two weapons, the performances of the 6-in. gun sink into the shade altogether. The latter even when mounted upon the most scientifically constructed central-pivoted or broadside Vavasseur carriage, has to be relaid between each discharge; the 44-pr., on

the other hand, is aimed with a shoulder-piece, and not a moment is lost by the action of recoil. Hence it is unlikely that more than one well-aimed shot could be directed from a 5-in or 6-in. steel gun every two minutes; whilst in the same time no less than twenty-four rounds could be fired by the 36-pr. The 100-pr. is still more remarkable in its attributes of power, range, and penetration: with a weight not exceeding that of the 6-in. steel breech-loading gun, it has as extensive a range, a far higher power of penetration, and will throw projectiles with nearly as great rapidity as the smaller quick-firing gun. The development of our new siege-train has been proceeded with. Three of its more important pieces of ordnance are the 4-in. and 5-in. steel breech-loading guns and the 8-in. rifled howitzer. The siege carriage for the first two of these weapons is infinitely superior in make to anything of this nature in Continental siege artillery parks. Its recoil is controlled by a hydraulic buffer, connecting it with the platform, so that it only runs back 5 ft. It is constructed to fire over a 6-ft. parapet, and is capable of being fired at 25 deg. of elevation, or 5 deg. of depression, having thus an arc of 20 deg. altogether. It consists of two powerful steel lattice-girder brackets, with a solid steel axle-tree. The highest possible range with the 5-in. gun would be 10,000 yards. Steel projectiles of all natures have been "sealed" for service with the siege guns. A modification of shrapnel for the 8-in. howitzer has also been introduced, from which great results are expected. Instead of a small aperture being left in rear of the bullets to contain the bursting charge in its little shalloon bag, the base of the shell is virtually changed into a mortar sufficiently stout and large to contain a considerable charge of powder. This, when it explodes, immensely increases their destructive force. The angle of descent of a howitzer's projectile is so steep that, unless some expedient of this sort were adopted, the bullets would merely drop to the earth from their own gravity when the shell was exploded. Great changes are being made in the armament of our coast batteries. The fact which we brought to notice some months ago as to the impossibility of obtaining anything like an adequate range for modern requirements from many of our coast guns, owing to the inherent defect in the garrison carriages and in the port-sills of casemated batteries, which prevented an elevation of more than 7 deg. being obtained, has at length attracted the attention of the War Office, and an effort is being made to modify existing mountings as to obviate this defect in the carriages, and to enlarge the size of the port-sills where practicable. It is impossible to over-estimate the value of such modifications when effected. As matters at present stand, we challenge a contradiction to the statement that few, if any, of our existing coast batteries have a range of fire exceeding two and a half miles. The new system of disappearing pneumatic mountings, as applied to the 6-in. steel breech-loader, is being adopted everywhere. It consists of a stout wrought-iron framework, with revolving pivot, working upon racers below, within which the gun is suspended on the extremities of levers under the trunnions and under the breech. A recoil press engages with the trunnion levers, and at the discharge of the gun the piston is driven downwards, the force thus generated being sufficient to raise the gun again into a firing position.

Whilst upon the subject of long ranges we must not omit to mention the great discovery in artillery science which has been brought so prominently to notice during the past year—Major Watkin's "position-finder." It has exceeded in practice the most sanguine hopes which had been entertained as to its powers. A description of it has already appeared in these columns. Let it suffice to say here that the position-finder automatically follows the movements of an enemy's vessel, at any distance up to ten miles, by the simple action of laying a telescope upon the object, the pursuit being accomplished by a handle imparting the direction and another accelerating or retarding speed as required. The course being also automatically traced upon paper, a prediction is taken as to the probable position of the ship after a known interval. Upon this position any number of guns which are in electric communication with the position-finder are laid, and as the doomed vessel reaches the spot a button is pressed and a salvo of projectiles is hurled against it. The further from the battery that the position-finder is placed the better for it, as a steadier platform is obtained. When we come to the question of steel for projectiles, it has to be admitted, with regret, that very little progress has been made. In a trial of the Palliser steel against steel plates, in comparison with Holtzer steel projectiles, which was recently instituted, the experiments being made with a 6-in. gun, the Palliser shell penetrated 10½ in., and came out the other side—but, alas! in fragments. The Holtzer forged steel projectile went clean through, and was found unhurt beyond. This is a serious reflection upon our steel producers. To get steel projectiles from Germany or France, is not creditable for a nation that was the pioneer in iron trades to the whole of the civilized world. It is satisfactory to know that the trial of "high explosives," as fired in shells from rifled guns, has made considerable progress. An explosive agent, said to be superior to mélinite, and far more reliable in its action, is under consideration at the Royal Arsenal, Woolwich. In the experimental trials which have taken place, these high explosives have only been used in guns of small calibre. The explosive was packed into an inner casing of the projectile, which was surrounded with indiarubber, and a very thick indiarubber disc was placed between the charge and the base of the shell. A very slow burning compressed cartridge was employed; thus the shock of discharge, hitherto found fatal to the stability of the high-explosive burster within the shell, was so toned down by the cushion of india rubber and the gradual development of the powder gas-waves, that "prematures" were avoided generally, though such have actually taken place. We omitted to mention that a very effective metal fuse has been introduced into the service durfng the past year. It has both "time" and "percussive" action combined. The "percussive" is restrained by a metal ball, which is released by the setting back of a plug on the shock of discharge, and leave the detonator free to ignite against a pin, when the shell strikes an object. The "time" arrangement is much on the principle of the old "Armstrong E" time-fuse, but when set for action, which is optional, flashes right through the percussive arrangement behind it into the interior of the projectile. Vast improvements have been effected in artillery drill lately.—*Army and Navy Gazette.*

Comment and Criticism.

I.

"Relative Values of Field Artillery Guns."

Capt. Charles Shaler, Ordnance Dept.

THE tables published by Lieut. Schenck in the May number of the JOURNAL are sufficiently interesting to make it worth while to point out a few of the errors embodied in them relating to the U. S. 3.2 inch guns.

In some remarks made by the Ordnance Board in 1887, on the proposed substitution of a 3.25 for a 3.2 inch gun, it was indicated that for the latter the shrapnel weighed 13.5 instead of 13 pounds, carried 157 instead of 107 bullets, and had an initial velocity of 1668 instead of 1750 feet. The correct data are also given by Lieut. Schenck in an article published in the *Journal of the U. S. Cavalry Association* for November, 1888. (See Journal referred to, p. 293.) The *Army and Navy Register* for September 8, 1888, contained several tables, one of which included the corrections mentioned, and showed also that the ammunition chests carried 42 instead of 30 projectiles. The caissons for horse artillery will probably carry two of these chests, and as one and one-half caissons are assigned to a piece, the total number of rounds carried for each gun is 168 instead of 126.

The errors above alluded to are so radical as to invalidate many of the results tabulated. Take, for example, the two tables relating to horse artillery guns, which face page 199 of the May JOURNAL, entitled:

(1st.) IN BATTERY. BATTLE CONDITIONS. HORSE ARTILLERY GUNS.

	Proj. Lbs.	$d/_w$	Bullets. N°	At 4500 yards. Velocity. f. s.	At 4500 yards. Energy. f. t.	Smoke.	Volume of fire.	Totals.
U. S. 3".2 as tabulated.	13	0.787	107	675	41	375	155	
U. S. 3".2 as corrected.	13.5	0.759	157	671	42	375	205	

(2d.) BATTLE CONDITIONS, RELATIVE VALUES, ETC., H. A. GUNS.

U. S. 3".2 as tabulated.	84	84	50	92	82	56	60	508
U. S. 3".2 as corrected.	88	88	73	91	84	56	80	560

With these corrections the positions of the guns named in the column headed "order of merit" in the table last referred to, will undergo the following changes:

AS TABULATED.		AS CORRECTED.	
1. Proposed	100	1. Proposed	100
2. Russian	90	2. Russian	90
3. English M. L	87	3. English M. L	87
4. German	81	4. U. S. 3".2	86
5. U. S. 3".2	77	5. German	81
6. Austrian	74	6. Austrian	74
7. French	74	7. French	74

A figure of merit, however, which relates to "battle conditions," and takes no note of ammunition supply, can hardly be considered (to use the words of the compiler) as "beyond the question of a doubt." If the number of projectiles carried per gun were introduced into the corrected tables, it would again change the order of merit thus:

	Projectiles per Gun.	Values.	Previous Values.	Totals.	New Order of Merit.		Values.
Proposed	160	95	654	749	1	Proposed.	100
Russian	165	98	587	749	2	Russian.	91
English M. L.	142	85	570	655	3	U. S. 3".2	88
German	154	92	528	620	4	English M.L.	87
French	160	95	486	581	5	German.	83
Austrian	152	91	487	578	6	French.	78
U. S. 3".2	168	100	560	660	7	Austrian.	77

Figures may be arranged to produce almost any desired result. In the JOURNAL OF THE MILITARY SERVICE INSTITUTION for September, 1888, there were tables which showed that "beyond the question of a doubt" the 3".2 gun was at the bottom of the list. Now come the May tables placing it 5 out of 7. The correction of a few errors makes it the fourth and the introduction of another element places it third. The rule of three and simple addition can hardly settle the question of the best gun.

Leaving out of consideration the number of projectiles carried and taking the corrected figure of merit for what it is worth, it appears that of existing guns mentioned, the Russian gun has been slightingly referred to, and with good reason, by Lieut. Schenck himself,* the English M. L. is almost obsolete, while the 3".2 is superior to any piece of a similar nature possessed by either Germany, France or Austria.

The following table being brief, shows at a glance the most important data for horse artillery guns:

		† Germany. 8, c. Mod. '73	† Austria. 7, c. Mod. '75.	‡ Italy. 7, c. Mod. '74	† Russia. Lt. 4-Pdr. Mod. '77	† France. 8, c. Mod. '77	U. S. 3.2 Mod.'89	U. S. 12-Pdr.Lt. Mod. 1857
Diameter of bore	In.	3.1	2.95	2.95	3.43	3.15	3.20	
W't of gun	Lbs.	858	658	656	800	940	829	
W't of gun carriage	Lbs.	1098	1027	871	968	1130	1166	
W't of limber loaded	Lbs.	2000	1734	1276	1982	1397	§1757	
W't of gun carriage and limber loaded and equipped	Lbs.	3966	3414	2734	3786	3498	§3780	3851
No. of horses		6	6	4	6	6	6	6
W't per horse	Lbs.	661	569	684	631	583	630	642
Shrapnel. W't loaded and fuzed	Lbs.	12.16	10.5	9.25	15.35	12.54	13.5	
Shrapnel. Balls	No.	152	105	120	165	93	157	
Shrapnel. W't of each ball	Gr's	200	202	247	165	309	218	
W't of charge	Lbs.	2.75	2.10	1.87	3.16	3.3	3.75	
Initial velocity	F. S.	1525 (?)	1386	1381	1350	1608	1668	
Projectiles in chest	No.	38	40	38	30 (?)	29	42	

This table indicates that the weight carried per horse is less for the U. S. 3".2 than it was for the 12 pdr. light guns, some of which were used for horse artillery during the

* JOURNAL MILITARY SERVICE INSTITUTION, September, 1888, p. 340.

† From Lieut. Schenck's tables in May number of JOURNAL.

‡ From *Public Service Review*, and attributed by it to *Revue Militaire Belge*.

§ With 3.75 lb. charges.

Civil War. The Austrian and Italian guns, with their light projectiles, are hardly comparable to the others. The French gun carries a less load for each horse principally for the reason that it uses lighter projectiles and charges and carries fewer of them.

A consideration of these facts will prevent such a misconception of the merits of the 3".2 gun as might lead to an erroneous preliminary estimate of its qualities, and nothing else is at present necessary.

II.

"A Few Words on Horse-Shoeing."

Captain Moses Harris, 1st Cavalry.

I AM so heartily in sympathy with Major Rodney in his advocacy for improvement in horse-shoeing methods, that it is with reluctance that I disagree with him in in any single point of his article.

The toe-clip is of no earthly use, but was probably authorized by the Board of Officers in deference to the suggestions of expert horse-shoers. There can be no excuse for the use of the knife upon the exterior of the hoof wall.

It is, certainly, remarkable that in these days of progress we adhere with such persistency to the methods of shoeing in vogue for the past hundred years. No educated veterinarian can now be found who will not assert that frog-pressure is essential to the preservation of the horse's foot in a healthy and sound condition. This is no longer a question for scientific inquiry. It is an established fact, which is not disputed. And yet we continue to use shoes which make such pressure impossible. The choice lies between the Burden and the Goodenough. The former shoe has been in use for years, and is the one most popular among blacksmiths. It is one-half an inch thick at the heel and three-eighths at the toe, and weighs twenty ounces. Of course, there is no thought of frog-pressure connected with this shoe, the idea in raising the heel being, evidently, to preserve the frog from injury by contact with the ground.

In 1873, the Goodenough shoe was placed on the market, and subsequently an earnest attempt was made to introduce it into the Army. This attempt was so far successful that a favorable report was made upon it by a Board of Officers, and it was ordered to be supplied for issue when called for. The principal merit claimed for this shoe was that, by its use, full frog-pressure would be secured. It weighs about one pound, is three-eighths of an inch thick at the heel and five-eighths at the toe. Frog-pressure cannot be secured with this shoe without destroying the bars of the hoof; and by raising the toe while the heel is cut away, the foot is given such an unnatural position as to give rise to evils quite as serious as those which it was claimed it would cure. By the use of either of these shoes, or of any others supplied by the Government, the vital organs of the foot are rapidly destroyed, and the period of usefulness of the animal much shortened. Their useless weight adds enormously to the labors we exact from our faithful and patient ally, restrict his celerity and freedom of movement, and by their power of conduction, through the heat generated by friction, scorch and destroy the life of the horny hoof with which they are in contact, thus rendering a return to correct principles more difficult. It is, unquestionably, true that in a state of nature the feet of the horse require no protection; and it may be conceded that through the adaptive power of nature such protection can be dispensed with, except in cases where the animal is used in daily work which involves constant travel over rocky ground, gravel-covered roads, or city pavements. Under these conditions all past experience has shown that some sort of protection by shoeing is necessary. Captain A. G. Forse, 1st Cavalry, a strong advocate for non-shoeing, has permitted me to refer to his experience in this matter: In the fall of 1880, while stationed at Fort

Walla Walla, Washington Territory, he removed the shoes from his horses: In May, 1881, with his horses still unshod, he marched to Fort Lapwai, Idaho, one hundred miles distant, with no injury to the horses' feet. In the fall of the same year, the attention of the Department Commander having been called to this unusual proceeding, he was required to keep one-third of the horses shod in front; but with this exception all of his troop horses remained unshod during the three years which he remained at that post, his troop in the meantime performing its ordinary duties, frequently scouting over rough and mountainous country. In June, 1884, the 1st Cavalry having been ordered to change station to Montana, his troop commenced its march to Fort Custer. Upon reaching the vicinity of Helena, Montana, the march having been for the whole distance over wagon roads, the horses' feet became so tender that it was found necessary to shoe them. This practically ended his experiment, as he no longer found encouragement to persist in it. In this instance it will be seen that after horses had gone four years without shoeing, when, it may be presumed, that their hoofs were perfectly sound and hard, a long march on a gritty road compelled a return to the objectionable shoe. Indian ponies are kept as near as possible in a natural state, and their perfectly formed hoofs seem as hard as iron; and yet, who that has followed the trail of fleeing Indians, for long distances over rocky country, has failed to find these animals abandoned on the trail with hoofs worn to the quick? It is inconceivable that a system of shoeing which is practised over the civilized globe, and which annually costs many millions of dollars, should have grown up if no necessity for it existed. It may be granted that through the ignorance and prejudice of an interested class, the system is, to the last degree, faulty and inhuman, but it must be believed that self-interest is too acute not to have discovered the fact, if all shoeing is needless. It is true that in military service horses are not required to do constant daily labor; but provision must be made for every possible contingency, and there must be an absolute certainty that the horses' feet will not give out under any possible conditions of service.

Major Rodney well remarks that "Old customs will only be discarded little by little, and no radical change can ever be looked for." But is it too much to hope that conservatism in high places will so far yield to the spirit of progress as to permit and encourage the leaving of horses unshod in garrison, when it may be found practicable, and to provide for issue, when applied for, shoes of the following description:

1st. A steel three-quarter shoe, perfectly flat on the inner or foot surface, extending back to the bars, and sunk into the hoof by trimming away the horn and cutting a square shoulder at that point. The shoe should not exceed $\frac{5}{16}$ of an inch in thickness, and would not weigh more than five ounces.

2d. A full-sized shoe of the same general character and thickness, and weighing not more than seven ounces. It is my opinion, founded on experience, that the shoe first described will afford complete and perfect protection under all circumstances, and is preferable, inasmuch as it leaves the frog and the most important parts of the hoof untouched in their natural state. The full shoe should, however, be provided as a concession to the conservative spirit which abhors rapid and sudden changes.

These shoes can be cheaply made by the process known as the "drop forging," and would cost less than one-third the price of the shoes now in use. The saving thus affected would not be inconsiderable, and is easily estimated. But although not susceptible of accurate estimate, it is believed a much greater saving would result in the decrease of the number of animals annually condemned and sold for foot diseases, and in the increased period of usefulness insured to these faithful servants by freedom from the torture and mutilation to which they are now subjected.

Bvt.-Colonel R. F. Bernard, Major, 8th Cavalry.

I agree with Major Rodney in many things; his remarks on the foot, the brittle nature of the hoof after being shod, its quick return to its natural condition when allowed to go bare-footed, the clumsy gait of a horse that is kept shod, and the elastic gait of an unshod horse—these are all true.

It is also correct, when shoeing a horse, to have his feet as nearly natural as possible, and to use light, thin and narrow shoes.

I do not understand what Major Rodney means when he says, "Intelligent people wonder why it is that one horse can wear out a half dozen sets of legs; and they never take pains to inquire into the cause." I must take exception to the following broad assertion: "That shoes are a positive injury, and, no matter what may be said in their favor, ruin thousands of horses every year, that would otherwise be healthy and useful."

I have used horses that were never shod, and know just how much work they can stand before getting sore feet. I have followed Indians, who never shoe horses, until every pony they had was abandoned with sore and bleeding feet.

The horse, in his natural wild state, never voluntarily goes fast over a rocky country, and shuns all muddy or swampy places. Now, if we take him from his natural state and require him to carry loads or pull wagons over all sorts of country, we must shoe him; and when we do, let us try to leave his feet as nearly natural as possible. Then, when he is not in use, let us take off the shoes and allow the feet to resume their natural condition.

I have obtained the best results in keeping horses' feet in good condition by taking off the shoes in the fall and allowing them to run bare-footed all winter, shoeing only when I had to do hard service.

At Fort Bidwell, California, one winter, when the troop horses were all unshod, seven men, who were given mounted passes, deserted. Having detailed an officer and nine men to pursue, I ordered their horses to be shod, and they left the post twenty-four hours later than the deserters. The ground was frozen hard, and, in many places, rocky. The deserters were overtaken in less than one hundred and fifty miles. All their horses had become lame, while the ten shod horses returned in good condition.

If we take a force of cavalry with all the horses' feet in the very good condition in which Major Rodney describes his to be, and require them to make a rapid march of four or five hundred miles, as is often done, over rocks and sand, through mud and water, over good and bad roads, such as all cavalry encounter on long marches, every one of them will get footsore and many of them will have to be abandoned; while, under the same circumstances, shod horses will stand up to the work and keep in better flesh than the unshod.

Major Rodney speaks very feelingly about the tender and delicate points of a horse's foot, and, knowing these things so well as he does, I cannot understand why he will put his barefooted horses on a bed of rocks for five hours a day; nature must harden their feet to enable them to endure the pain. Alexander the Great, who introduced this standing cavalry horses on rocks to harden the feet, did so, probably, for want of the art of shoeing or lack of material to do it with. At the present day we lack neither.

Wild horses never stand to rest on a rocky soil, but seek the shade of trees where the earth is dry and soft; this I know to be the case.

In 1868 I was sent to Mexico to buy pack mules for the Army in Arizona. I was advised by all Mexicans, that I talked to on the subject, to go to a ranch known as the "Rocky Ranch," as the mules raised thereon had such hard feet that they never re-

quired shoeing. I went there and bought eighty mules—some of them were sent to my post for service. I soon found that marching over mountain trails for a few days with packs, thirty-five or forty miles a day, put their feet into such a condition that they had to be shod.

I have a horse that never had shoes on his hind feet. On the sixth of this month I rode and led him to the top of a high, steep and rocky mountain—the trip over rocks, hard and sharp, was not more than five miles—the horse returned with his hind feet worn off, so as to be very tender ; the next day both hind ankles were swollen. Had the shoes been off the front feet his condition would have been much worse.

We have proof that timely and proper shoeing has improved the horse's foot. We know that constant and bad shoeing permanently injures many horses Therefore, when we shoe, do it at the proper time and with judgment.

I will here say, without fear of proof to the contrary, that unshod horses cannot possibly do hard and continuous duty, without becoming lame and unfit for service, before doing half the work of shod horses, under the same circumstances. But for all ordinary work in garrison, horses' feet will remain in better condition if left unshod.

Captain T. J. Wint, 4th Cavalry.

" A Few Words on Horse-shoeing " by Major Rodney, show careful investigation of the subject, and his experience is of value to officers of the mounted service, even though they may not fully agree with him in all of his conclusions. I believe that much unnecessary horse-shoeing is done in our Service and that horses with sound feet should not be shod, except when shoes are required on account of excessive wear of the hoof; but for continuous marching over rough country I have always found it necessary to shoe all horses in *front*, and the hind feet of most of them. In my opinion the hardness and wear of a hoof is greatly controlled by climate, and the footing surface during the march. I have not found it difficult to keep the feet of my troop horses in sound and serviceable condition, although my blacksmithing for many years has been done mostly by men who never shod a horse before coming to the troop, their instructions being substantially as in the following " Note on Horse-Shoeing." I do not object to the toe-clip, and to give greater wear to thin shoes enter at the toe a small piece of steel, as suggested some years ago by 1st Lieut. W. C. Brown, 1st Cavalry.

" Shoes are placed on horses' feet to protect the bearing-surface of the wall of the hoof from wear, which under certain conditions would be excessive, and the object to be attained is to protect this surface in such a way, that the hoof will, as near as possible, retain its natural shape and bearing on the ground; and were it not that a shoe has thickness, and does not expand and contract with the hoof, but few questions could arise as to the best method of shoeing. Consequently, the thinner the shoe can be made with necessary strength and durability, the less the hoof must be trimmed from its natural shape to receve it, and if attached to the hoof at the toe and quarters where the wall is thick and strong, the action of the parts of the foot will be least interfered with. The wall of a forefoot toward the heel is thin, and nails driven there are of little service in securing a shoe, and frequently are the cause of much harm by injuring the wall, and holding that part of the foot as in a vise, not allowing it to expand, when the horse is in motion, or to spread during growth. Five nails are generally sufficient to properly secure a front shoe, two in the inner toe, and three or four in the outer toe and quarter.

" In preparing a sound foot for a shoe a rasp is generally all that is necessary, and a knife should not be used except to trim away ragged parts, fit the toe-clip, and to notch where the nails are to be clinched, and the rasp should not be used on the outside of

the wall, for, if it is rasped over, the hoof will become dry and brittle, and if rasped down to fit a shoe that is too small it has so much less bearing-surface on the shoe.

"The shoe should be perfectly fitted to the bearing-surface of the wall except at the heel, where it should extend a little to the side of, and back of the heel to allow for the growth of the hoof forward and downward; otherwise the ends of the shoe will, in time, be carried forward and inward, and rest under the sole leaving the heel unprotected.

"The closer the shoe is fitted to the bearing-surface of the wall the less will be the strain on the nails, and if properly put on, the sole cannot rest on the shoe, nor receive injury from it, as the wall grows faster than the sole, and remains strong, whereas the sole on attaining a certain thickness becomes dead and flakes off." *

Major Adna R. Chaffee, 9th Cavalry.

I have read with unusual interest the article of Major Rodney entitled, "A Few Words on Horse-Shoeing," published in the JOURNAL of the Institution for May. Experience of my own, on a small scale, enables me to become a ready convert to the theory advanced by Major Rodney. Both of my horses were badly injured a year ago by shoeing. Last November I determined to allow nature to repair the damage done if it could; it did not fail. Both horses now have excellent feet, and no argument could induce me to put a shoe on them again. Being convinced from this experience (and the further fact that my own horses have better action bare-footed than when shod), that cavalry horses in garrison and light field work are as serviceable bare-footed as with shoes on, I ordered the shoes off the horses of the two cavalry troops stationed at this post, and directed that the horses be not shod again unless ordered by me.

I have never tried the tempering process described by Major Rodney.

An excellent authority remarks on the foot of the horse as follows: "I may here remark, if the reader will pardon a short digression, that nature appears to furnish horses with feet suitable to the locality in which they are bred." If we allow this remark of Sir. F. Fitzwygram to stand as a fact, and I think no one will dispute it. We may not hesitate to believe that nature will respond to the hardening process of Major Rodney, and in the manner described by him, develop feet capable of resisting the ordinary wear of garrison and field.

It is possible, very probable in fact, that several days of scouting in the mountains—an infrequent duty for some of our cavalry troops—would wear the feet so much as to cause lameness. I know that such work is very hard on shoes, and the bare-foot must be hard indeed to resist the grinding that takes place under horse's feet when ascending and descending steep and rocky places. But this isolated case does not materially affect the general statement, that for garrison and ordinary field work the horses should not be shod. Personally, I feel grateful to Major Rodney for making known the results of his experiences.

FORT DU CHESNE, UTAH, May 25, 1889.

Bvt. Major J. B. Campbell, Capt. 4th Artillery.

Animal nature is generally created, fully equipped to resist the wear and tear, and to supply the wastes it is subject to in its natural state of existence. That this is not the case when artificial conditions and requirements are imposed upon it, is exemplified in innumerable instances in the daily routine of civilized existence.

That the foot of the equine race will supply all the demands made upon it when confined to carrying the animal wherever it will, and at its own gait for feeding purposes, which with propagating its species, is the end and aim of its existence in a

* By Capt. Wint, Instructor in Hyppology, U. S. Inf. and Cav. School, Fort Leavenworth.

state of nature, none will probably deny. When called upon to carry in addition a burthen, varying generally in artillery service from six hundred pounds to almost the animal's own weight, not upon the elastic turf of its feeding ground, but upon causeways purposely made hard and inelastic, and generally full of sharp cutting grit, the experience of many centuries and many different people have found it necessary to fortify nature's power of rebuilding, against this additional cause of wear, by covering the hoof with a more resisting material than bone. This is so, not only in the case of quick moving solipeds, but also with the slow and ponderous cloven-footed species when used as beasts of burthen.

In an article in the JOURNAL for May, upon the subject of horse-shoeing, as against the mature experience of centuries, to prove the inutility of protecting a horse's feet by shoeing, was placed the fact that the mount of a field battery standing without shoes for some months at a picket line for five hours a day, upon a macadamized platform; that with unshod hoofs the same battery was moved at a trot through five miles of Chicago streets without injury to the horses' feet. In the first instance, the author estimates the picket line experience to equal a march of five miles upon a similar roadway the horses had only their own weight to support, and only to keep up the motion necessary to keep off annoying flies; in the second instance the battery had not its complement of ammunition in its boxes (presumably). Without admitting the equilibrium claimed in the first instance by any means, we will say that in service conditions, each battery horse has to throw upon his feet the equivalent of about seven hundred pounds of weight in addition to his own, and that from fifteen to twenty miles a day is considered an average march on the roads of our country.

That the resisting and recuperative power in the hoofs of any set of unshod battery horses, however it may have been encouraged and developed, would stand such wear and tear for a month or more, is very problematical. If Battery "F" 4th Artillery had, under such conditions been marched from its old station, Fort Snelling, Minn., to its new one Fort Riley, Kans., unshod, and passed through the ordeal with sound and serviceable feet, the theory advanced by its commander, of the uselessness of horse-shoes, would be received wrth much more credence than can ever be given to it. The battery horse must be prepared to do quick work, which, in proportion to its speed, is much harder upon hoofs than the ordinary marching gait. What would do for plowing on the farm would be very hard upon a roadster, and fatal to a city hack, express wagon, or dray horse. As the nature of the service required of a battery horse, often in a manner approximate to what is required of the last four, it is very much doubted whether shoeing is not a necessity for them.

That all horse-shoes are now made more heavy than the abundance and cheapness of improved material would warrant, and that the manner of preparing the hoof for their reception is often idiotic, and destructive to the comfort and usefulness of a horse, many will join Major Rodney in asserting, but until he has produced more facts in justification of his theory than are contained in the article in question, few officers having before them the arduous marching required in campaigning, will be willing to undertake it without well shod horses, and plenty of extra shoes in their forge besides.

Captain Edward S. Godfrey, 7th Cavalry.

In September, 1874, my troop was transferred from the Department of Dakota to the Department of the Gulf. The troop had been in the field through the Black Hills, during the months of July and August; many of the horses had quarter cracks made, through casting their shoes, while traveling through the rocky country. Before loading the horses on the cars, the commanding officer ordered all shoes removed. After our arrival at New Orleans, La., the horses were ordered to be shod. It was then that I

first saw and used the Goodenough Horse-shoe. Those supplied us were the kind used by the street car companies, and were too heavy. From New Orleans, my troop was transferred to Colfax, La., on the Red River. The country being free from turnpikes and rocks, I ordered all shoes removed, except from horses with quarter cracks which had special treatment. After a few months I received an invoice of Goodenough horse-shoes, suitable in size and weight for cavalry service, and, thereafter, the horses were shod according to the Goodenough system, except horses with contracted hoofs, which were left unshod. After eighteen months service in the south, we were transferred to Dakota to participate in the expedition against the Sioux, 1876. With possibly one exception of contracted hoof, there was not an unsound hoof in the troop. The Goodenough horse-shoe was used throughout the service on the plains and after trials with other shoes, I have no hesitation in saying that for a cavalry shoe, the Goodenough horse-shoe, made of strap iron as then furnished, is the best I have ever tried, and is the shoe *par excellence*, for field service.

At the U. S. Military Academy, the horses are used for both cavalry and artillery drills. The "Cavalry Plain" is of hard gravel, and is particularly severe on the horses' feet. During the first winter of my service there, I found that many horses fell, in turning the corners, etc., in the riding hall when the track was frozen. I became satisfied that many falls were due to the balling of the feet with the frozen tanbark. To have had them rough-shod was too dangerous; so all shoes were removed. Thereafter, the accidental falls from slipping were very few.

The artillery drills began in the month of April; after a few days I found the horses' feet were wearing away very rapidly, and it became necessary to shoe the horses used in the teams; the riding horses were not shod, nor did they require shoeing while used for that service alone. After the artillery drills were over, the shoes were again removed.

When all drills were over the horses were put into a pasture which was very rocky; in a few days many of the horses had their feet badly broken up and their feet were very tender, some had to be shod, and before a month, nearly every horse had to be shod. The service there was rather irregular; about one-third of the year the horses were shod, the rest of the year they were unshod. The horses stood on brick floors in the stables, and part of the time on cobble stones at the picket line.

The spring following my return to duty with my troop, I had all shoes removed, my private horses included. While in garrison the horses gradually were unshod. Whenever going into the field, however, the horses were shod, because the Regulations required it, and I did not feel authorized to take the official responsibility for a possible censure in case of disaster, because of a difference of opinion as to what might be considered proper for field service.

My private horses were used for both saddle and driving purposes. During my first winter in Dakota, they were rough-shod throughout; the next winter they were rough-shod in front, but without shoes behind, and thereafter, except for field service, they were unshod at all seasons.

I believe that for garrison service the horses should generally be unshod. In the main I agree with Major Rodney, but maintain that the climate, character of country, and kind of service are important factors in any system affecting the care of horses' feet.

Bvt.-Major H. C. Cushing, Captain 4th Artillery.

I agree, in the main, with Major Rodney, and wish that the War Department would order such an exhaustive test of the matter that it could be definitely settled. There is a very reasonable doubt as to whether unshod horses could stand the constant wear and tear of work on city streets, but even that is a *doubt*. I have talked the

matter over with persons who use a great many horses, and some think it feasible, others not. The judgment of such persons is not to be lightly passed over. But, as far as the artillery horse is concerned, there is nothing under the present circumstances to prevent his being unshod. His work is mainly on turf, the few marches made are mainly over dirt roads, and even in time of War he is rarely subjected to any exceptional work. It is a great pity that the recent change of Major Rodney's battery from Fort Snelling to Fort Riley had not been accomplished by marching instead of by cars. That would have given his horses' feet a test of several hundred miles marching over a variety of roads, and would have enabled him to have seen whether there were any defects in the matter. I think, however, that there is every reason to warrant one in accepting his conclusions. But, as he says, it takes some time to educate the hoofs of your horses, and unless one has assurance that his troop or battery can go through the education unmolested by inspectors or marching orders, he hesitates to commence it. One great difficulty we labor under is, that we have to take our horses as we get them—purchased from Tom, Dick and Harry, of every sort of breed and previous condition. Assuming that the unshod horse can undergo all the vicissitudes of service, it would be to the greatest advantage if we could be furnished with horses which never *had* been shod. This leads me to submit that our system of obtaining horses and mules is entirely wrong and expensive. As I understand it, whenever a troop or battery requires new horses they are purchased on contract in the small quantities required. This does not result in our getting the proper animals, and is expensive. Some officers, writing on this subject, advocate a Government farm where the horses requisite for the supply of the Army could be raised. I do not think such a scheme is advisable. No doubt a farm or breeding establishment of the kind would give us good animals, but it would be an expensive institution. In my opinion, the best way to get at what we want is to give the contract for the supply of *all* the horses and mules required for the Army, for a term of years, to one person or firm. If such a contract could be secured for ten years a man could enter into the business with a reasonable hope of making money for himself, for he could sell to outside parties such animals as were not required by the Government. This great breeding and assembling establishment should be required to be located about the centre of the country—in Kentucky, Illinois or Missouri—where the climatic influences are such as to prepare the horse for the greatest variety of work, and where the expense of transportation could be reduced to the minimum, availing ourselves of the rivers or cars, as most feasible. Officers of cavalry and artillery should be kept there as inspectors, just as ordnance officers are now kept at steel works or gun foundries. Certain requisites of training, both as to bitting and pace, should be required, and the place might be required to be a hospital or recuperatory (to coin a word) for worn out or disabled horses. The hoofs could be there treated according to Major Rodney's ideas. Such an establishment run by private parties, and inspected by Government officials, if assured of a life of ten years or more, would give us the proper horses at a minimum of expense. It is, in my opinion, a scheme worthy of consideration. The inspectors being at the farm, always, can come to know the horses well, and thus be unable to be imposed upon. Such an establishment should have, or rather the Government should have, its own cars for transport and a small detachment of men to send with horses. If such an establishment was organized all that would be necessary then would be for the Q. M. General, on receiving a requisition for horses, to say, "Send to C. O., of such and such a troop or battery, so many bay horses."

The same car that took the horses could take back those worth recuperating.

The inspectors should only be at the place in an advisory capacity. Their advice as to form, education, etc., would be duly heeded.

Reviews and Exchanges.

A Manual of Strategy.*

THIS is a handy little book of reference, on what is, perhaps, the most difficult chapter in the Art of War. It goes over the whole subject of strategy, treating it clearly and concisely, and avoiding, as a rule, all confusing complications. The subjects are taken up in their natural sequence, and explained and discussed in the simplest language, which even a layman can understand. There is no surplusage in the book. Then the translator seems to have caught the spirit of the author, and clothed his ideas in English dress with such skill that the book reads like an original English composition. There is none of that stiffness in the language which is so difficult to exclude from translations of technical works.

As a matter of course, there is nothing that can be called new in the book. The principles of strategy are unchangeable. But the arrangement and treatment of the subjects are excellent, and the language clear and simple.

In his first chapter, the author defines the three principles of strategy, and calls his definitions "precepts." In this way he gives prominence to the three articles of the strategist's creed. This first chapter contains the whole science of strategy. The remainder of the book is devoted to what may be called the application of the precepts to particular cases.

In the second chapter the relations which subsist between strategy and grand tactics are discussed. In many campaigns strategy controls the tactics of battle. Sometimes the requirements of the two are in harmony, as at Waterloo, and sometimes they are in opposition. At Waterloo, strategy demanded that Napoleon should attack Wellington's left, so as to separate him from Blucher. Tactics also called for an attack on his left, because that was the weakest part of his line. But if Wellington's left had been the stronger flank, then the requirements of strategy and tactics would have been in conflict.

The author's definition of "Theatre of Operations" calls for no comment, but that of "War Policy" is in our opinion somewhat broad. It is, perhaps, impossible to define accurately what should be the functions of the State during the progress of a campaign. Of course it determines the character of the War, the strength and composition of its armies and the objective of the campaign before the campaign begins; but when it undertakes to "combine and co-ordinate" the movements of armies during the campaign, it is interfering with the functions of the General-in-Chief, and disaster is apt to follow. That the State frequently does interfere in this way cannot be denied, but we are sorry to see such interference characterized as legitimate in a professional work.

Clear as the author is in most of his definitions, he becomes somewhat involved in discussing "points." We find *Strategic Points, Points of Support, Points of Opera-*

* *Manual of Strategy*, by Lieut.-Col. Fix, translated from the French by Lieut. Henry R. Lemly, 3d Artillery.

tions, *Points of Manœuvre* and *Objective Points* described and discussed; and while the several definitions seem clear and essential by themselves, when viewed as a whole we cannot help thinking that the analysis has been carried too far. So also in the discussion of Lines, we find names introduced which only serve to complicate and obscure the subject. We find "Natural Lines' of defense and "Artificial Lines" of defense, which are clear and explicit enough without the introduction of "Territorial Lines" and "Strategic Lines," which mean exactly the same thing. Such vagaries of nomenclature, which disfigure the pages of so many professional works, are the fruit, no doubt, of familiarity with the literature of the science. Every author almost has his own favorite nomemclature, and copyists are afraid to ignore them lest it should be charged against them as ignorance.

Bases of Operations, primary, secondary and accidental are next described and discussed, and we find nothing objectionable in the definitions or illustrations until we come to the "Configuration of Bases." The bald assertion that "a salient angular base is most advantageous" is apt to mislead. It is so only under certain conditions. If an army operating from a salient base has its depots of supplies in the salient, and possesses the issues of the frontier on both sides, then, indeed, the salient angular base would be the best; but if these conditions are absent the salient angular base is dangerous.

The discussion of "Re-entrant Angular Bases" and "Maratime Bases" calls for no comment; but when we come to the discussion of "Fronts" we find the same redundant nomenclature complained of in the treatment of *Points* and *Lines*. Why the expressions "Strategic Front" and "Front of Operations" should be so tenaciously clung to by most authors, when they admit that they are synonymous, passes comprehension. It is true, this author claims "a fine shade of distinction between the two," but he finds some difficulty in explaining wherein the distinction lies. Certainly it is altogether too fine to justify a complicated nomenclature in an elementary work.

"The Line of Operations" of an army, the author says, is also called "The Path of the Army," "Its Line of Supplies," or of Re-victualling "Its Line of March or Retreat," which is another good example of confusing and unnecessary nomenclature. But in addition to these "equivalent expressions," we find "Secondary Lines of Operations," "Accidental or Essential Lines of Operations," "Double or Multiple Lines of Operations," "Convergent Lines of Operations," "Parallel Lines of Operations," "Divergent or Eccentric Lines of Operations" and "Interior and Exterior Lines of Operations," and we cannot help thinking that for an elementary work the classification has been carried too far. In this connection we quote a couple of sentences from the review of Derrecagaix's work on Strategy in the May number of this JOURNAL. "We should say the Line of Advance of an army is the system of roads which connect it with its objective. The Line of Operations is that part of the Line of Advance which lies in front of the army, and the Line of Communications is that part which lies behind it."

On the subject of railways the author gives seven cases in which they have changed or modified the application of strategical principles. But, he adds, they cannot have their full effect unless their operation is made a part of military training in time of Peace.

The VIth and last chapter is devoted to campaigns. It is clear and concise, and calls for no comment.

We have only skimmed over the surface of the Manual looking for flaws, and if we think we have found some we are not blind to the general merit of the work. We recommend it to colleges as a text-book. It costs only 50 cents. "C."

The Roman Republic.*

Messrs. Bryans & Hendy have done good service in preparing this abridgement of Prof. Mommsen's History of Rome. They have "tried," to use their own words, "to avoid writing down to a boy's level, and have produced a book valuable, not only to school-boys, but to the more advanced collegian, and, in fact, to all whose time, opportunities and wishes will not permit an exhaustive study of the subject. Even for those students, the book, as it stands, affords an excellent manual, with references indicating where fuller material may be found.

The style is very readable, though that is of small consideration in a book of this kind. For it is the office of the historian to instruct, not amuse. Prof. Mommsen's works on this subject seem to us both true and pertinent. Speaking of Polybius, he says: "Polybius is not an attractive author; but as truth and truthfulness are of more value than all ornament and elegance, no other author of antiquity, perhaps, can be named to whom we are indebted for so much real instruction."

It is to be regretted that where the *language* of Mommsen is quoted, the abridgers have not always given the complete text. Thus, on page 506, in the chapter on The Old Republic, and the New Monarchy—the most instructive and interesting in the book—we have, "It is a terrible picture, but not one peculiar to Italy; wherever the Government in a slave State has fully developed itself, it has desolated God's fair world in the same way. * * * As in the Hellas of Polybius, and the Carthage of Hannibal's time, * * * the all-powerful rule of capital ruined the middle class, raised trade and estate-farming to the highest prosperity, and ultimately led to a * * moral and political corruption of the nation * * * Not until the dragon-seed of North America ripens will the world have again similar fruits to reap." With this note, "Written in 1857, see Note page 486." The reference to p. 486 seems to mean that with Mommsen slavery alone, is the legitimate progenitor of Cæsarianism; perhaps a little fuller reading of the text would show that "the all-powerful rule of capital" which "ruined the middle class, * * * and ultimately led to a * * * moral and political corruption of the nation," is more truly and really to be regarded and dreaded as the "dragon-seed of North America," as it has been of other lands and other Republics.

H.

Infantry Fire Tactics.†

In a volume of convenient size, containing over five hundred pages, Captain Mayne presents the subject of "Fire Tactics" in a logical and comprehensive manner. While treating the subdivisions of the subject in detail, he enumerates the principles upon which to base the general conclusions "that superiority of fire is to be obtained more by a rational and good tactical use of the rifle than by any actual superiority of armament (though this consideration must be given its full weight), that fire at short ranges should be the general rule in order to obtain decisive results, and, that long-range fire should only be made use of under conditions favorable to its efficacious employment; while at all ranges the most stringent control over the fire should be maintained."

The author arranges the qualities of a military rifle according to relative importance, descendingly, as follows: Long range, flatness of trajectory, accuracy of fire, rapidity of fire, penetration, and maintains that the object of progress in the develop-

* The *History of the Roman Republic*, abridged from the History by Professor Mommsen, by C. Bryans, Assist. Master in Dulnich College, and F. I. R. Hendy, Assist. Master in Lette's College. New York: Charles Scribner's Sons, 1889.

† *Infantry Fire Tactics*, by Capt. C. B. Mayne, R. E. (Revised Edition.) Gale and Polden, Chatham, England.

ment of the rifle should be "flatness of trajectory rather than increased accuracy"—the former quality of the rifle being independent of the man can, therefore, be more readily utilized in masses of men. Another reason for this conclusion being his belief that "the ideal of rifled fire in the field is reached when no bullet in the intervening space between the opponents passes over the head of a standing man."

Against independent or uncontrolled fire, at ranges beyond 400 yards, the logic of argument, fortified with examples, is especially directed as being the cause of enormous waste in ammunition and detrimental to success in War, which can only follow from mutual action in groups or fire units, under strict fire discipline, controlled by leaders acting under the direction of a commander.

The value of the breech-loading rifle does not depend on rapidity of fire, but upon rapid loading, so as to insure a man to be ready when the favorable moment comes—rapid firing being, in general, inaccurate, worthless and wasteful of ammunition, and in the same manner must the magazine rifle be regarded. It may be noticed, as to the magazine rifle, that the writer proves himself to possess broader and more pronounced views as to its value and tactical use than can be attributed, in general, to English writers.

Throughout the book, the reader is made to realize the small value, upon the battle-field, of great accuracy in individual fire at target practice, with its attendant conditions of fine sighting, delicately graduated rear sights, known distances or easily judged ones, etc.—all primary teaching, sometimes with misdirected energy—or, to use the language of the French, "musketry regulation." At long ranges, the errors of appreciation, the atmospheric conditions and simultaneous use of several sights make the accuracy of individual fire of no practical value, and, at short ranges, where it would have some value, the exact elevation would never be employed! What is the use, therefore, of losing much time and money to teach soldiers to fire with rigorous accuracy if they can never make use of this accuracy in battle? The French have evidently learned something from their experiences in 1870 and 1877. The author concludes that fire discipline, direction, and control are the ends desired in order to get maximum efficiency from the modern rifle and to secure success in War.

The text is replete with useful information, terse summaries, and definite, even bold, conclusions. It must be studied to be fully appreciated.

H. C. CARBAUGH, 1st Lieut. 5th Artillery.

The Story of the Goths.*

This is one of the most interesting of that very entertaining series of "The Story of the Nations." It is believed that this is the first English book to give us a clear and succinct account of the history of the Goths from the earliest times to the end of the Gothic Dominion in Spain. For three hundred years—beginning with the days of Tacitus—their history consists of little else than a dreary record of barbarism, slaughter and pillage. A century later the Goths have become the mightiest nation in Europe. We look forward two hundred and fifty years and the Gothic kingdoms are no more; the nation has vanished from the stage of history, leaving scarcely a trace behind.

When it is remembered that, excepting a part of a translation of the Bible and some two or three short pieces of writing in the Gothic language, the Goths have left us no literature, it will readily be seen that the author, Henry Bradley, undertook a task which would have appalled most writers.

It is a very readable book, and is published in the usual attractive form of G. P. Putnam's Sons' publications.

* *The Story of the Goths*, by Henry Bradley, with maps and illustrations. New York: G. P. Putnam's Sons, 1888.

The Story of Mediæval France.*

This is another of Putnam's famous series. Including the time from the reign of Hugues Capet to the beginning of the sixteenth century; this history covers the period of the Crusades, full of chivalric adventures, and of the Hundred Years' War, with stirring descriptions of the famous battles of those days.

In writing this boook, the author Gustave Masson, has consulted freely the chronicles and writings of the Capetians and the Valois, and has presented his facts in a most charming style. He also devotes several chapters to resumé of the intellectual life of the mediæval period, in which it may be noted that Froissart is *the* chronicler *par excellence*, and Philip de Commines the first really philosophic historian of which France can boast.

The book is bound in the same form as "The Story of the Goths," and both abound in illustrations.

REVILO.

In Honor of Sheridan.†

This meeting, held at the residence of Col. Gouraud, was composed of about fifty officers and men, past and present, of the U. S. Army and Navy, many of whom had served under our late commander.

It was convoked for the purpose of placing on record their opinion of Gen. Sheridan's character, their sensibility of the loss sustained by the country by his death, and their sympathy with his relatives. Col. Gouraud, who had been an Asst. Inspector-General of the 18th Army Corps, and an A. D. C., was called to the Chair, and Col. E. O. Vollum, Medical Director U. S. Army, was chosen Secretary. The following resolutions were adopted:

WHEREAS, The Americans temporarily residing in England, and serving or having served in the Army and Navy of the U. S., desiring to express their sympathy with his family in the death of their former comrade and Union commander, and late Commander-in-Chief of the Army of the U. S., it is therefore

Resolved, That in the death of Gen. Philip Henry Sheridan, our country is called upon to mourn the loss of one of her ablest Generals, whose great services to the Union will always be held among the most valued memories of our nation.

Resolved, That we tender to his wife and family our respectful condolence and sympathy in the death of a good husband and loving father.

Resolved, That a copy of these resolutions be signed by the officers of this meeting and transmitted to the family of the deceased.

Col. A. D. Shaw, of N. Y., being called upon to second these resolutions, among other things said: "There was a charm about him that drew to him a host of devoted admirers, and he was always frank and generous and chivalric in his cordial intercourse with them, for there was no false pride about him." Again, "His best monument is the Union his great services did so much to save, and among those who will revere his memory the longest is the race his victories helped so much to set free." And, quoting Gen. Grant's words to the Hon. John Russell Young: "'As a soldier, as a man capable of doing all that is possible with any number of men, there is no man living greater than Sheridan. Then he had that magnificent quality of swaying men, which I wish I had.'"

Lord Wolseley, being unable to attend, wrote: "It was he who first taught the

* *The Story of Mediæval France*, by Gustave Masson, B. A., with maps and illustrations. New York: G. P. Putnam's Sons, 1888.

† *A Record of the Proceedings of a Meeting held in Honor of the late Gen. P. H. Sheridan* at Little Menlo, Norwood, Surrey, England, on Aug. 25, 1888.

mounted troops of the U. S. what the real power of their arm was, and how they could be used to the greatest advantage.

"He was a grand fellow all around, and I feel as proud of him and of his achievements as if he had been commissioned by the Queen instead of by the President."

In answer to a cablegram sent by the committee to Mrs. Gen. Sheridan and children, Col. M. V. Sheridan says: "Mrs. Sheridan wishes me to say to those who took part in the meeting, that no message of condolence from any source has touched her more than this expression of love and admiration for her husband." B.

Commanders-in-Chief, U. S. Army.*

1.—General George Washington—15 June, 1775, till 23 Dec., 1783.
2.—Major-General Henry Knox—23 Dec., 1783, till 20 June, 1784.
3.—Captain John Doughty, Artillery—20 June, 1784, till 12 August, 1784. *Senior Officer of the Army.*
4.—Lieut.-Colonel-Commandant Josiah Harmer, 12th Infantry—12 August, 1784, till 4 March, 1791. *Brevet Brigadier-General, 31 July, 1787.*
5.—Major-General Arthur St. Clair—4 March, 1791, till 5 March, 1792.
6.—Major-General Anthony Wayne—5 March, 1792, till 15 Dec., 1796.
7.—Brigadier-General James Wilkinson—15 Dec., 1796, till 3 July, 1798.
8.—Lieut.-General George Washington—3 July, 1798, till 14 Dec., 1799.
9.—Major-General Alexander Hamilton—14 Dec., 1799, till 1 June, 1800.
10.—Brigadier-General James Wilkinson—1 June, 1800, till 27 Jan., 1812.
11.—Major-General Henry Dearborn—27 Jan., 1812, till 15 June, 1815.
12.—Major-General Jacob Brown—15 June, 1815, till 24 February, 1828.
13.—Major-General Alexander Macomb—24 May, 1828, till 25 June, 1841.
14.—Major-General Winfield Scott—25 June, 1841, till 1 November, 1861. *Brevet Lieutenant-General, 29 March, 1847.*
15.—Major-General George B. McClellan—1 November, 1861, till 11 March, 1862.
16.—Major-General Henry W. Halleck—11 June, 1862, till 12 March, 1864.
17.—Lieut.-General Ulysses S. Grant—12 March, 1864, till 4 March, 1869. *General, 25 July, 1866.*
18.—General William T. Sherman—5 March, 1869, till 1 November, 1883.
19.—Lieut.-General Philip H. Sheridan—1 November, 1883, till 1 June, 1888.
20.—General Philip H. Sheridan—1 June, 1888, till 5 August, 1888.
21.—Major-General John M. Schofield—5 August, 1888, till——

FOR REVIEW.

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* Compiled by Colonel R. H. Hall, U. S. Army.

OUR EXCHANGES.

ARTICLES OF MORE OR LESS MILITARY INTEREST.

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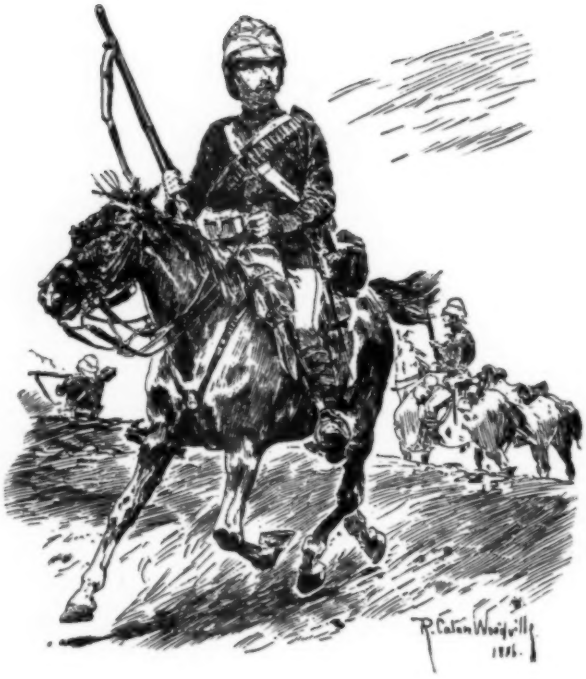

MOUNTED INFANTRY.

(See Page 520.)

Soldier 3d Battalion Mounted Infantry, British Army, Suakim, March, 1885.

(Reproduced from Journal R. U. S. I.)